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THE EFFECT OF ENVIRONMENTAL FACTORS ON THE RESPIRATORY HEALTH OF SCHOOLCHILDREN IN HAMILTON

CURRENT REPORT # 2

OCTOBER 1, 1979

URBAN AIR ENVIRONMENT GROUP

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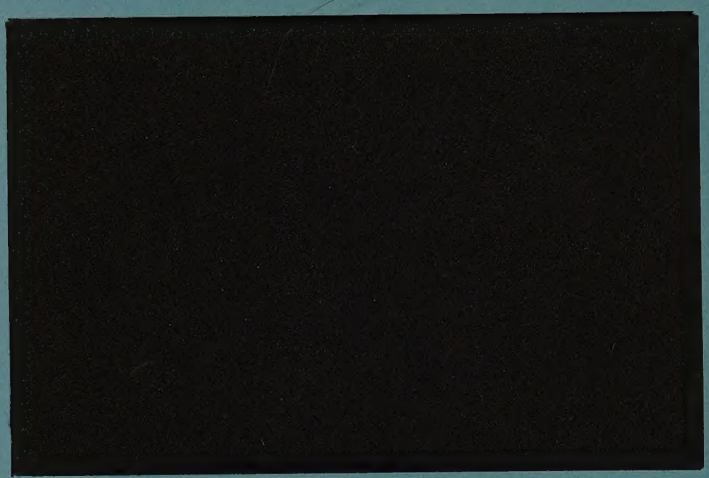

TO:

Health and Welfare Canada
Research Programs Directorate
Project 6606-1752-53

Ontario Ministry of the Environment
Air Resources Branch
Project 20

THE EFFECT OF ENVIRONMENTAL FACTORS ON THE RESPIRATORY HEALTH OF SCHOOLCHILDREN IN HAMILTON

CURRENT REPORT # 2

OCTOBER 1, 1979

Submitted by:

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5-1 SO_2 Data Tables

PERSONNEL SUPPORTED BY PROJECT FUNDS

Stephen Toplack	Project Manager and Supervisor of Air Monitoring
Bill Furlong	Air Monitoring Technician
Ruth Hershler	Data Manager
Elizabeth Inman	Supervisor, Pulmonary Function Studies
Eva Corrigan	Pulmonary Function Technician
Danae Fraser	Pulmonary Function Technician
Chris Flasch	Assistant, Pulmonary Function Technician
Debbie Henry	Assistant, Pulmonary Function Technician
Colleen Lafferty	Secretary
John Reid	Engineering Physicist
Alexander Quaglia	Research Assistant
Ian Rabenda	Technician
Mohammed El-Sherbiny	Doctoral Student
Juanne Kochhar	Research Assistant
Marnie Weber	Summer Student
Fran Allen	Administrative Assistant

PART 1

INTRODUCTION

This report is intended to be read in conjunction with Current Report #1 (March 1, 1979), which will be referred to subsequently as Report #1. It will follow the same format and is intended to outline the progress made since Report #1, to detail any changes in protocol and procedures,and to clarify any issues not resolved in the previous report.

PART 2

QUESTIONNAIRE SURVEY

2.1 PROGRESS OF SURVEY

The children from the first 24 schools had been surveyed as of June 15th. Of the remaining six schools, two have been deleted because the required sample size in their particular cell will have been reached without their inclusion. In one further cell, a school has been added, due to lower than expected enrolments in the neighbouring schools.

The response rate to date is as follows:

A.	Total assigned	3147
B.	Not eligible	137
C.	Total eligible	3010
D.	Completed interviews	2887
E.	Completion rate (D/C%)	96.0%
F.	Pulmonary function consents obtained	2866
G.	Consent rate (F/C%)	95.2%

The completion rate of 96.2% mentioned in Progress Report #1, has therefore been maintained and should be close to the final rate for

Year 1 when the remaining schools are completed, in September and October.

2.2 PLANS FOR YEAR 2

Re-survey of the entire sample will commence in late October. The school order will be as in Year 1. The questionnaire will remain substantially unchanged and the only additions will be questions about any respiratory illnesses in infancy. At the end of Year 2, we will therefore, have important information as to whether any differences, that may have been observed in Year 1, between various subsamples, are still present. This will greatly strengthen any conclusions drawn from these findings.

2.3 QUALITY CONTROL

The basic procedures outlined in Report #1, to ensure accuracy of questionnaire data, have remained unchanged. However, the following comments on these procedures are in order.

2.3.1 INTERVIEWER VERIFICATION

The results of this process are summarized by question in Table 2-1. It will be seen that the reproducibility of responses to each of the questions is high, except for question 17. This question concerns the number of rooms in the house or apartment. The difference in this number that did occur between the original and the verified reply

was almost always only one and we do not feel that this represents a problem requiring correction.

2.3.2 CODING VERIFICATION

The rate of coding error is shown below. This rate is only half that noted in Report #1 and is composed mainly of differences in coding of occupation.

# variables checked (5.1% of all cases)	928
# variables in error	26
Coding error rate	0.26%

2.3.3 OUT OF RANGE EDITING

Editing 2025 records showed no coding errors, but 7 keypunch errors were found. This error rate of .008 % is considered acceptable.

2.3.4 INTERVIEWER PROFILE

In Report #1, it was noted that there was a significant difference between the interviewers in the rate of positive responses to question 4 (Does the child have asthma?). Because differences in interviewer technique might have been responsible for this difference, this aspect was reviewed by the survey unit director, using a simulated interview featuring this question. In this interview, there were no differences observed between interviewers and we therefore feel that no intervention is required. Indeed, with the inclusion of the subsequent schools, there ceased to be a significant difference between the

interviewers in this question. There was no significant difference between the interviewers in the rate of positive responses to questions 1, 5 and 12. However, there was a difference in relation to the question on income. This appears to relate to the grouping of interveiws given to interviewers, resulting in certain blocks of low income housing being handled by a small number of interviewers. In review, we did not feel that there were variations in technique requiring intervention.

2.4 PRELIMINARY DESCRIPTIONS OF QUESTIONNAIRE DATA

Figures 2-1 to 2-3 show the incidence of respiratory illnesses in the children, of respiratory symptoms in the parents and the level of domestic smoking in the first 16 schools surveyed.

While no conclusions can obviously be drawn, it should be noted that the relative frequency of the various childhood respiratory illnesses corresponds to that obtained in surveys elsewhere.

TABLE 2-1

ERRORS FOUND WHEN QUESTIONNAIRE QUESTIONS RE-ASKED
FOR INTERVIEWER QUALITY CONTROL

QUESTION RECHECKED	NO. OF TIMES RECHECKED	NO. OF TIMES ANSWER DID NOT MATCH	% ERROR = # times in error / # times checked
3, 3a	9	1,1	11%
5	6	1	17%
6	6	0	0%
7	16	1	6%
8	10	0	0%
9	10	0	0%
10	7	1	14%
11	18	0	0%
17	26	12	46%
19	22	1	5%
20	26	1	4%
23	18	0	0%
25	10	3	30%

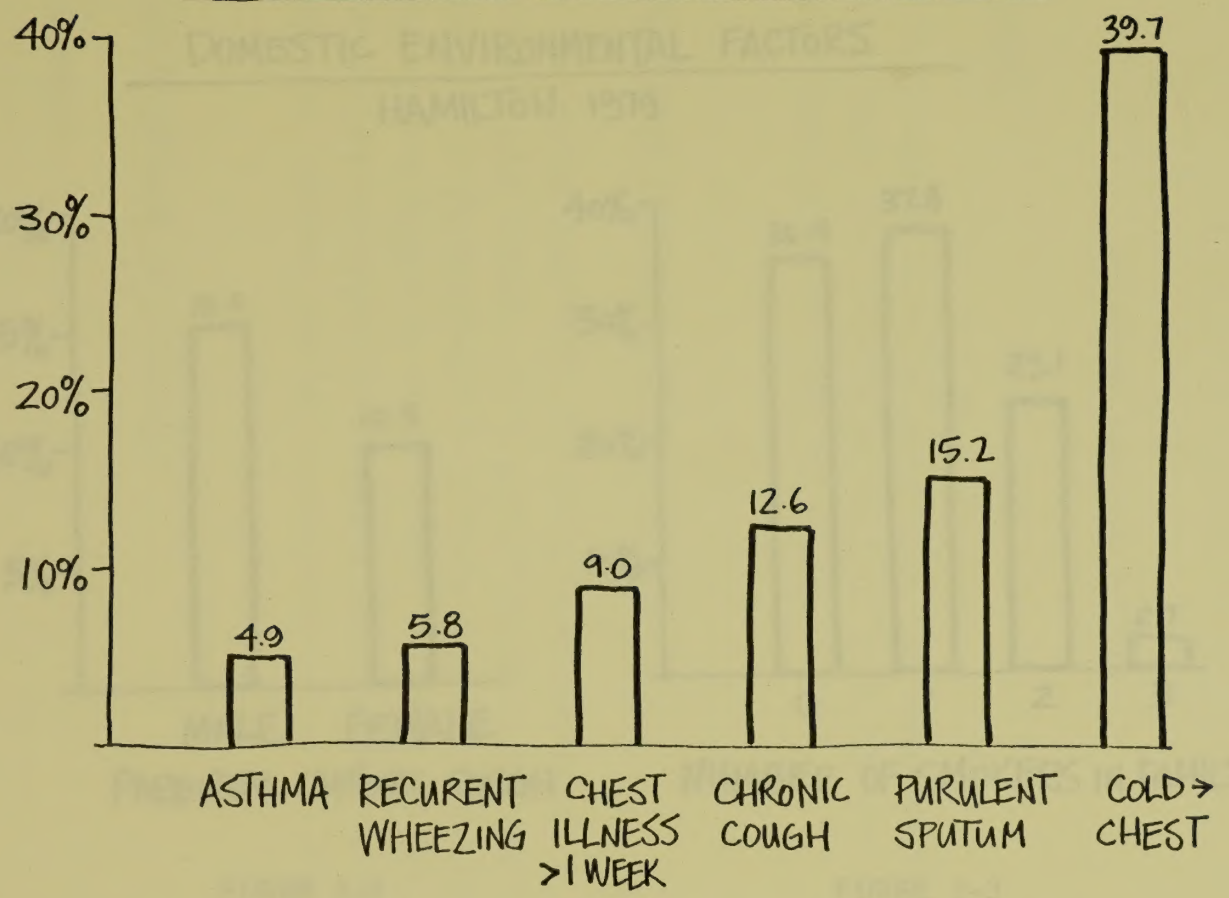

INCIDENCE OF RESPIRATORY ILLNESS
HAMILTON CHILDREN AGES 7-10 1979
40%
30%
20%
10%
4.9
5.8
9.0
12.6
15.2
39.7
ASTHMA
RECURRENT WHEEZING
CHEST ILLNESS >1 WEEK
CHRONIC COUGH
PURULENT SPUTUM
COLD → CHEST

FIGURE 2-1

39.1
15.2
12.6
4.0
2.8
4.0
40%
30%
20%
10%
ASTHMA
RECURRENT WHEEZING
CHEST ILLNESS >1 week
CHRONIC COUGH
PERSISTENT SPUTUM
COLD > CHEST

DOMESTIC ENVIRONMENTAL FACTORS

HAMILTON 1979

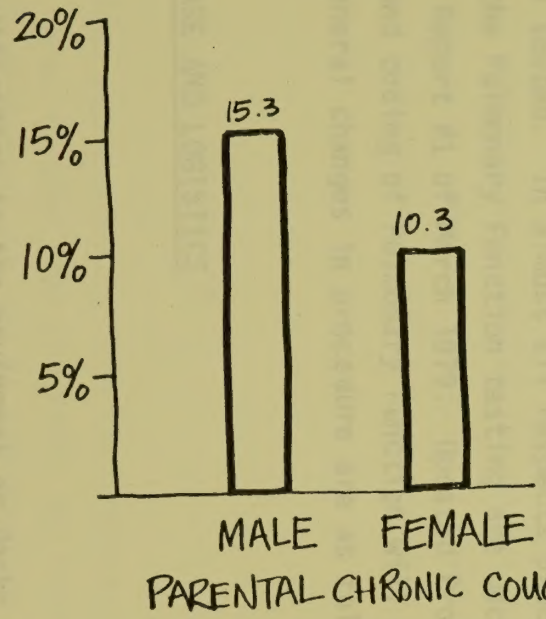


FIGURE 2-2

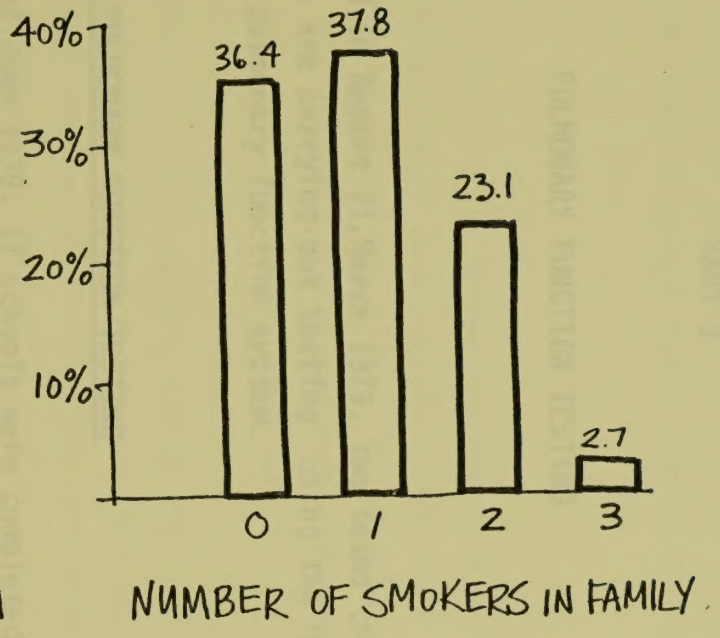
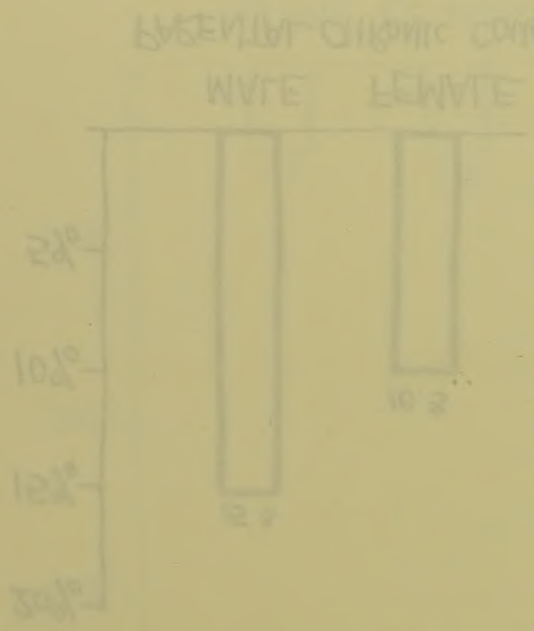
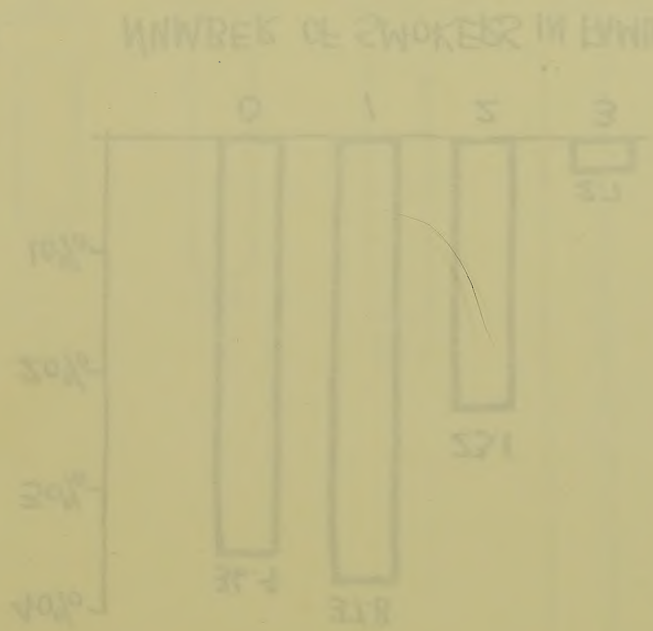


FIGURE 2-3





PART 3

PULMONARY FUNCTION TESTING

3.0 SUMMARY

As described in Report #1,March 1979, two teams consisting of two people each, are carrying out testing using the H.P. 478044 calculator-based pulmonary function system.

3.1 PROGRESS OF PULMONARY FUNCTION TESTING

By the end of June 1979, 17 schools were completed, in which 2202 children were tested. In almost all respects procedures and criteria relevant to the Pulmonary Function testing are unchanged from these described in Report #1 of March 1979. Updated Protocol and Criteria for testing and coding of Pulmonary Function will be found in the appendix. General changes in procedure are as follows.

3.2 SYSTEM HARDWARE AND LOGISTICS

3.2.1 EQUIPMENT

No further modification to the equipment or desks have been carried out. As the warranty on the Hewlett-Packard pulmonary function

equipment was to expire on September 1, 1979, a service contract with H.P. was signed, effectively extending the warranty for another year.

3.2.2 TRANSPORTATION

As mentioned in Report #1, it was decided that a van should be leased for the exclusive use of this project. The lease for the 1979 van chosen, began on February 21, 1979. The advantages of flexibility, convenience, and protection that had been expected, proved to be fully borne out. In particular, co-ordination of movement of pulmonary function equipment with servicing of the particulate sampling system was greatly facilitated by having the ramp stored most of the time in the van. An arrangement has been made with McMaster University's Department of Operations and Maintenance to supply required fuel and maintenance services for the van.

Since Report #1 assistance in moving in and out of schools has been required at only three schools. McMaster's Operations and Maintenance Department has provided this assistance when requested, and will continue to do so.

3.3 ORGANIZATION OF DATA COLLECTION

Last year's data was brought in from the schools at the end of every working day. Now, to save time and money the results are brought in weekly. The Data Manager can see no disadvantage to the project in a small time lag between testing and the final coding. Information

from the schools as to the number tested, children moved,etc. is phoned in to the supervisor at the end of each day, so the organization of the study is unaffected.

3.4 CODING

3.4.1 CODING PROCEDURES

During the last school year (1978/79), the lung function data was coded by 2 coders working at McMaster. Some of this coding is now being done by the two Assistant Pulmonary Function Technicians working in the schools. They code the Patient data, and the results of the NWm, FVC and Spirometry tests. These tests are easiest to perform, accurately reported by the H.P. equipment and require little subjective interpretation. This leaves the results of the NWs (closing volume) test still to be coded. This test is difficult to perform, and is sometimes incorrectly reported by the H.P. equipment. Results for this test need careful scrutiny and interpretation. They are therefore, for both teams, coded by the Supervisor of the Pulmonary Function Studies at McMaster. The reason for the above change was to make full use of staff time. As the Pulmonary Function Technicians became more familiar with the testing procedure they needed to rely less on the assistants, who consequently felt that their time could be more fully used. When one of the coders at McMaster left the project, it was therefore felt that some of her work could be absorbed by the assistants.

3.4.2 CODER QUALITY CONTROL

3.4.2.1 Results

As described in Report #1, the quality control on the pulmonary function data has now been completed for the first 17 schools (2,196 students tested):

Coder	No. of records recoded	Total No. of Coding Errors	% error 72 cols/record
#1	52	23	.6%
#2	52	15	.4%

The coding error rate is considered to be at an acceptable level.

3.4.2.2 Changes Made September 1979

Because of the changes made in the coding procedure (see 3.4.1), the following changes have been made in quality control. The Assistant Technicians recode each others' work, which is also recoded by the Supervisor. The NWs test is recoded by the Data Manager.

3.5 QUALITY CONTROL OF LUNG FUNCTION DATA

As described in Report #1 the data produced by the two teams of Pulmonary Technicians are compared to determine any differences between

the teams, for each group of four schools. This has now been done for the first 16 schools tested and no significant difference between teams has been demonstrated.

It will be noted that the percentage of missing values has declined for all variables since Report #1 (Table 3-1). The rate of success for all variables, except for closing volumes (CVs), the slope of Phase III (N2 diff) on seven year olds, is now acceptable. The percentage of missing CV values for this age group has decreased from 50% to 20%. Table 302 indicates the number of children in each age group tested by each team.

As a test of reproducibility repeat measurements have now been completed on approximately eight children from each of the seventeen schools studied this far. Scattergrams of the repeat measurements, from schools 05 to 16, for FVC, FEV1, MEF50, CV/VC and RV plotted against the original measurements of these variables are shown in Figs 3-1 to 3-5. It should be noted that the straight line drawn on these figures is the line of identity, while the constants on the bottom right-hand corner refer to the results of a least-squares regression model fitted. The high degree of correlation (R2) obtained for FVC, FEV1, and MEF50 is indicative of the good reproducibility of the measurement of those variables. RV and CV/VC are clearly less reproducible. For Systematic differences between the two measurements were examined by two-way analysis for variance. None were found except for FVC ($F=12.006$, $df=1,90$, $p<0.001$). The mean repeat FVC was 0.045 litres more than the mean initial FVC. This small difference is probably a reflection of the increased familiarity

of the child with the procedure and does not require any modification of protocol at this stage. This difference will, however, have to be re-examined at the conclusion of Year 1.

TABLE 3-1

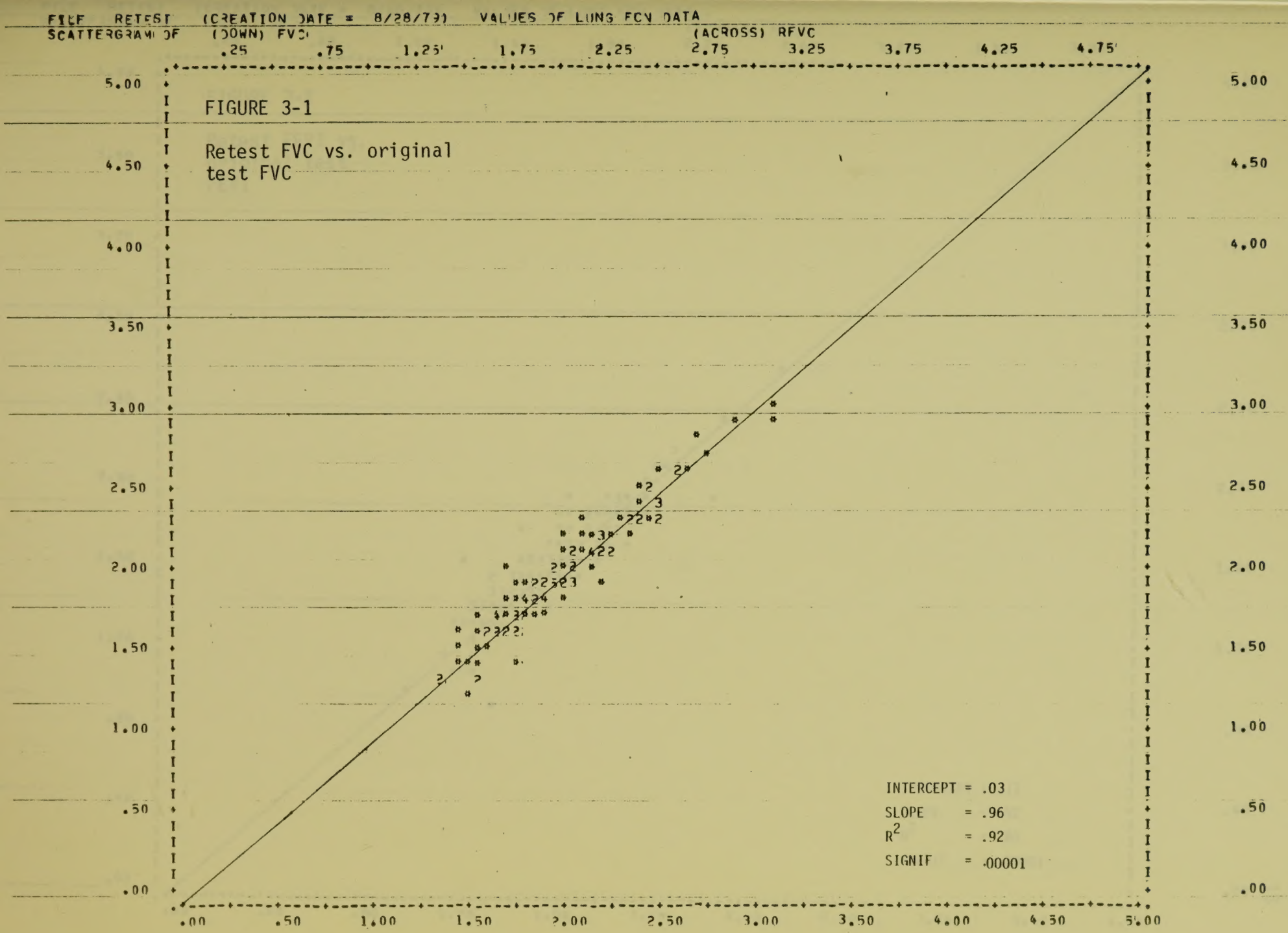
% MISSING LUNG FUNCTION MEASUREMENTS

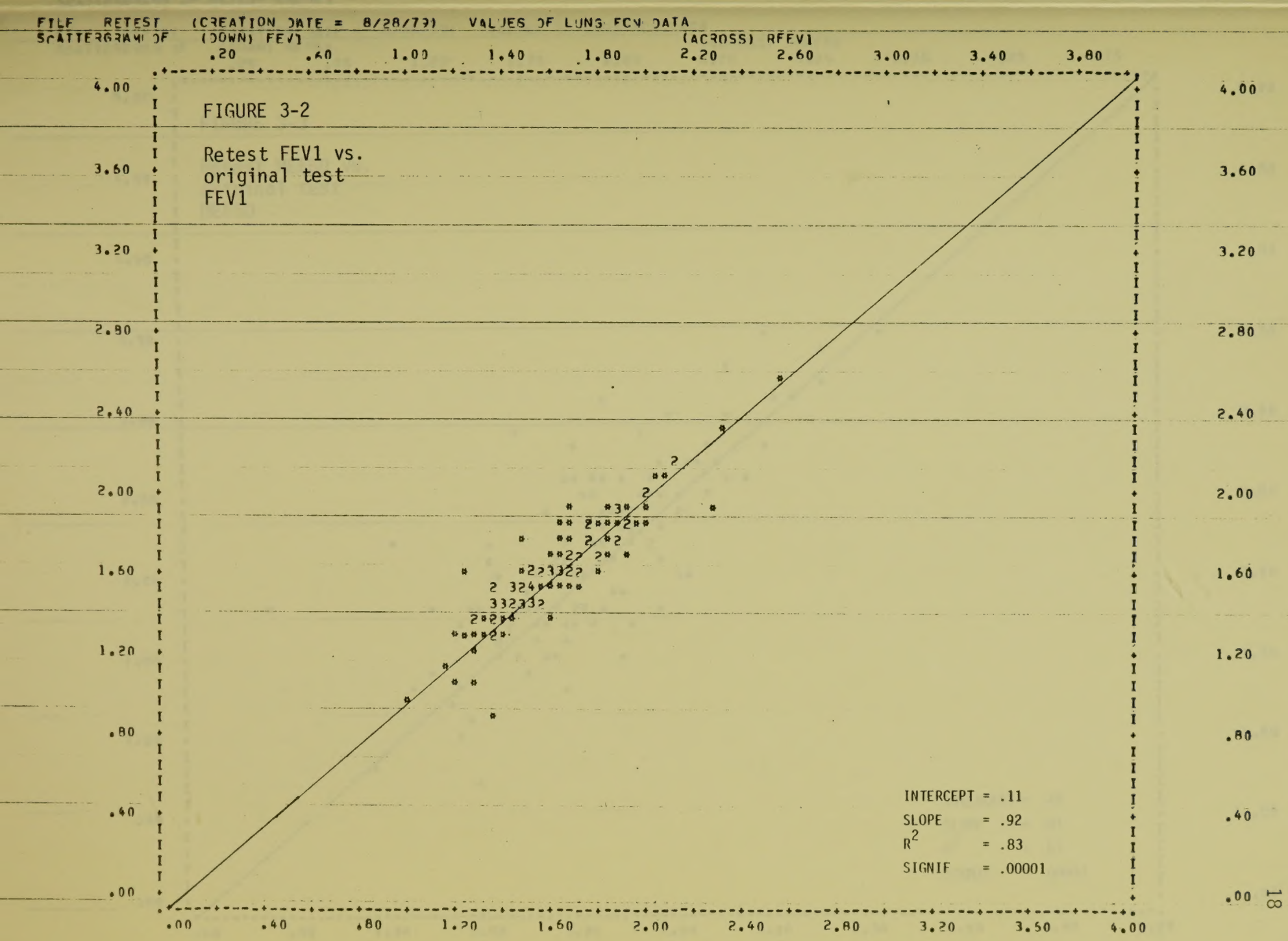
		AGE					
TEAM	TOTAL	7	8	9	10	11	VARIABLE
A	1.1%	1.1%	0.0%	2.5%	0.0%	7.1%	FVC
B	2.5%	4.6%	2.4%	2.0%	0.0%	0.0%	
A	1.9%	3.8%	1.7%	2.1%	0.0%	0.0%	VC
B	1.1%	2.0%	1.4%	0.5%	0.0%	0.0%	
A	2.8%	4.9%	3.1%	2.5%	0.6%	0.0%	RV
B	2.8%	5.9%	2.4%	1.5%	0.0%	10.0%	
A	1.6%	2.2%	1.0%	2.5%	0.6%	0.0%	FRC
B	1.6%	3.9%	0.9%	0.5%	0.0%	10.0%	
A	22.5%	41.8%	22.2%	18.8%	7.7%	7.1%	CV
B	16.4%	24.8%	16.0%	10.8%	12.3%	30.0%	
A	22.5%	41.8%	22.2%	18.8%	7.7%	7.1%	N2 DIFF
B	16.4%	24.8%	16.0%	10.8%	12.3%	30.0%	

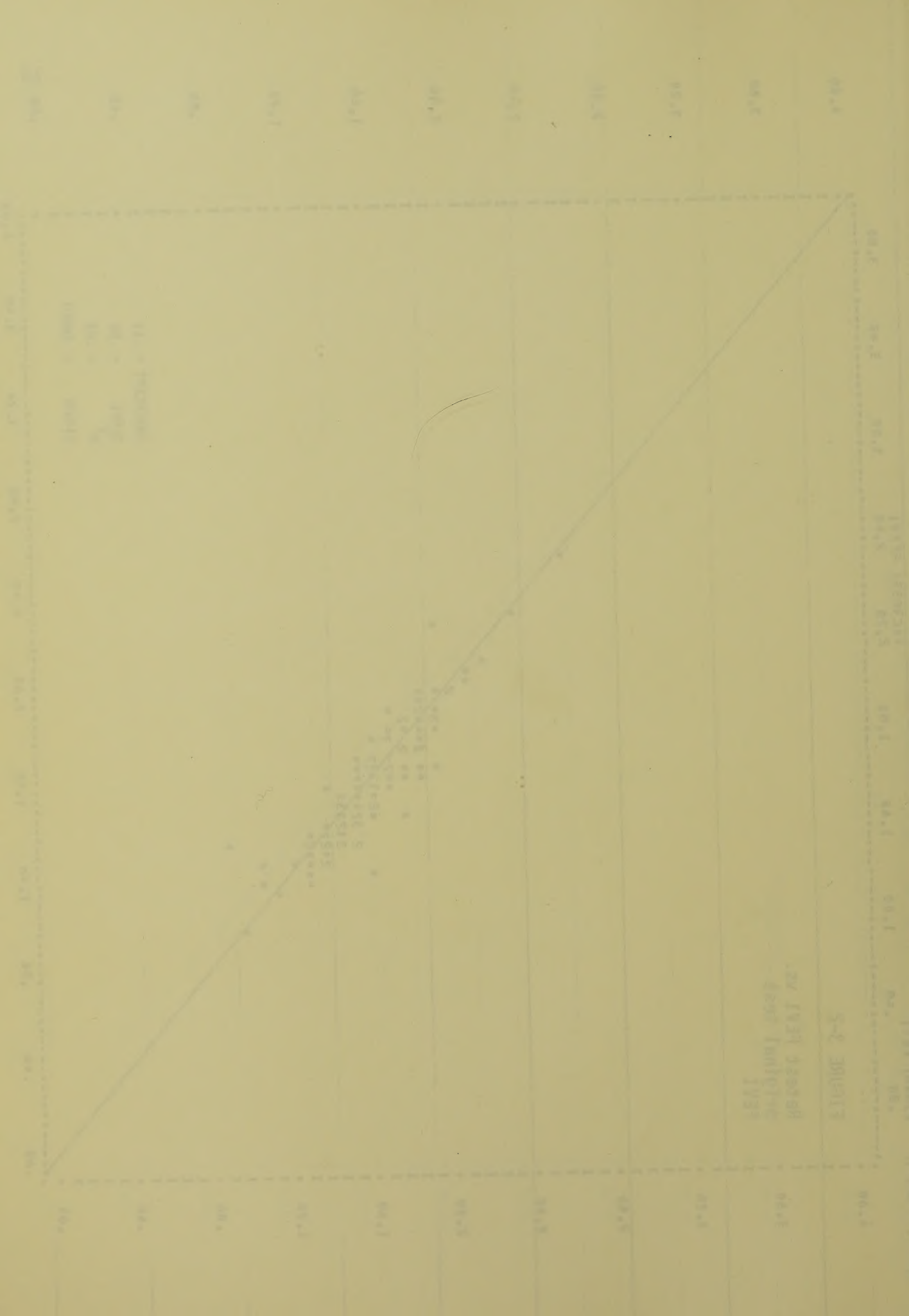
TABLE 3-2

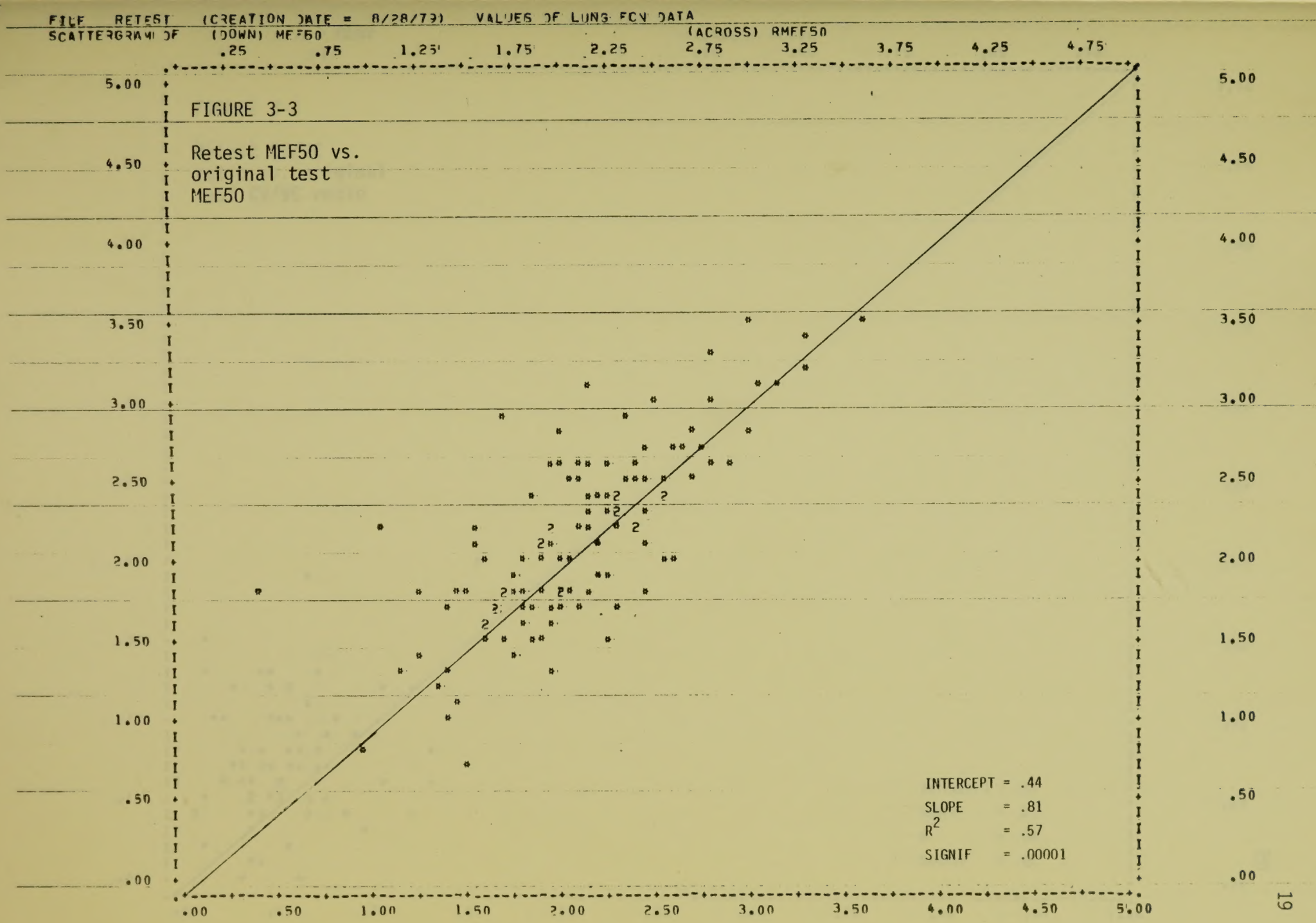
NUMBER OF CHILDREN FROM
EACH AGE GROUP TESTED

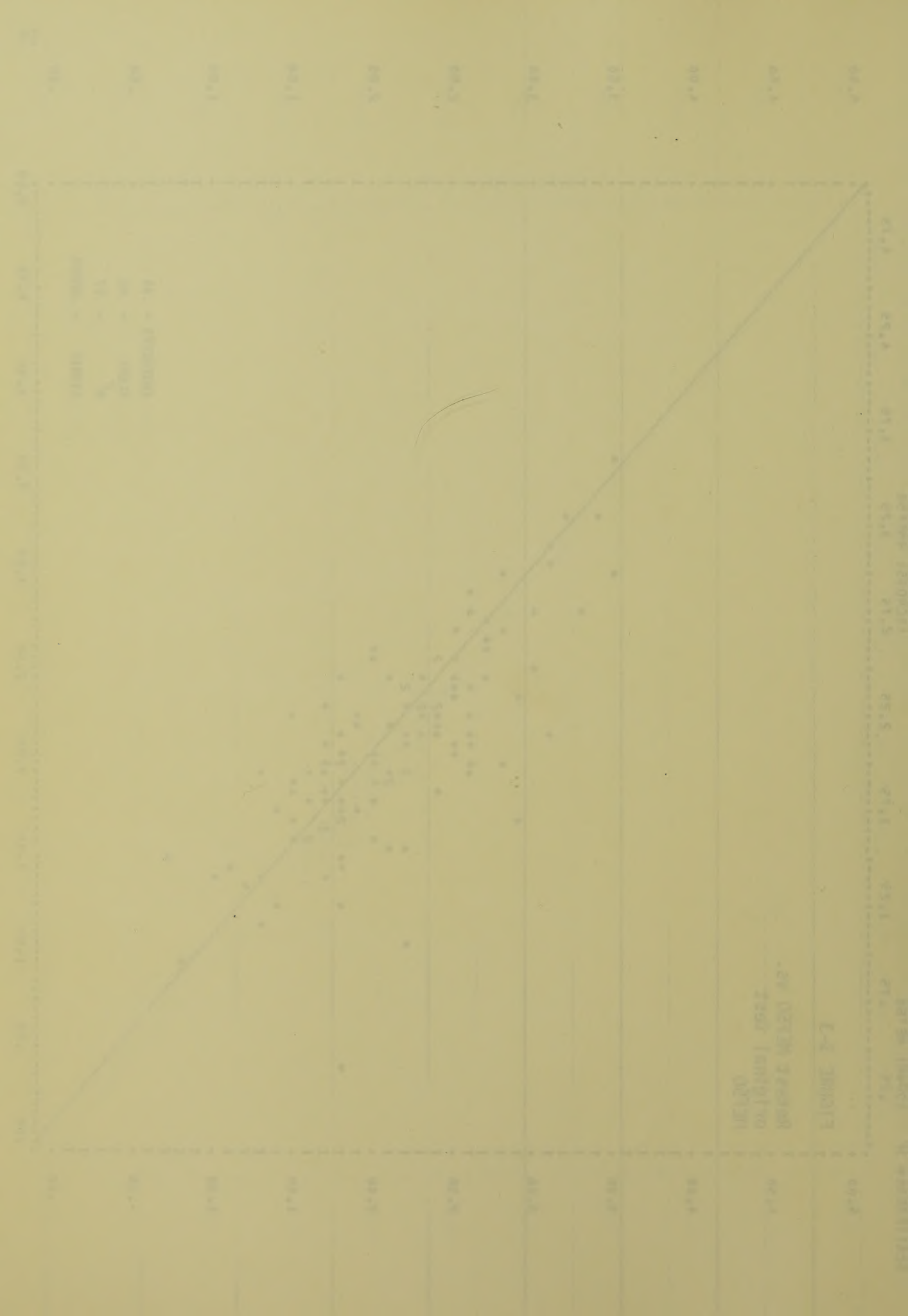
TEAM	AGE					TOTAL
	7	8	9	10	11	
A	182	293	240	156	14	885
B	153	212	203	57	10	635
TOTAL	335	505	443	213	24	1,520


FILE RETEST (CREATION DATE = 8/28/79) VALUES OF LUNG FCN DATA
SCATTERGRAM OF (DOWN) FVC (ACROSS) RFVC
.25 .75 1.25 1.75 2.25 2.75 3.25 3.75 4.25 4.75
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
.50
.00
FIGURE 3-1
Retest FVC vs. original test FVC
INTERCEPT = .03
SLOPE = .96
R^2 = .92
SIGNIF = .00001


FILE RETEST (CREATION DATE = 8/28/79) VALUES OF LUNG FCN DATA
SCATTERGRAM OF (DOWN) FEV1 (ACROSS) RFEV1
.20 .60 1.00 1.40 1.80 2.20 2.60 3.00 3.40 3.80
4.00
3.60
3.20
2.80
2.40
2.00
1.60
1.20
.80
.40
.00
FIGURE 3-2
Retest FEV1 vs.
original test
FEV1
INTERCEPT = .11
SLOPE = .92
R^2 = .83
SIGNIF = .00001
.00 .40 .80 1.20 1.60 2.00 2.40 2.80 3.20 3.50 4.00




FILE RETEST (CREATION DATE = 8/28/79) VALUES OF LUNG FCN DATA
SCATTERGRAM OF (DOWN) MEF50
(ACROSS) RMEF50
.25 .75 1.25 1.75 2.25 2.75 3.25 3.75 4.25 4.75
5.00 4.50 4.00 3.50 3.00 2.50 2.00 1.50 1.00 .50 .00
FIGURE 3-3
Retest MEF50 vs. original test MEF50
INTERCEPT = .44
SLOPE = .81
R^2 = .57
SIGNIF = .00001
.00 .50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00



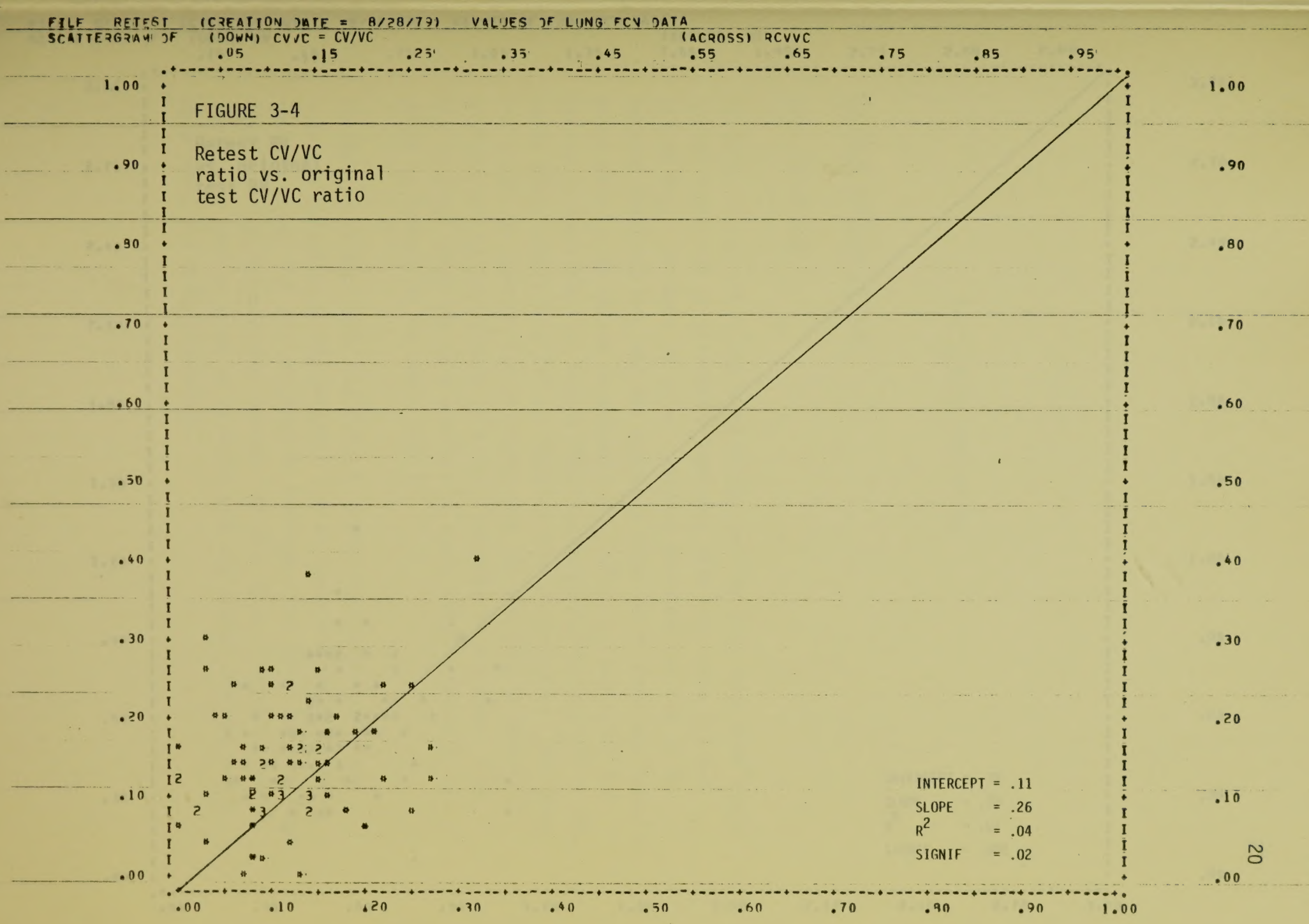
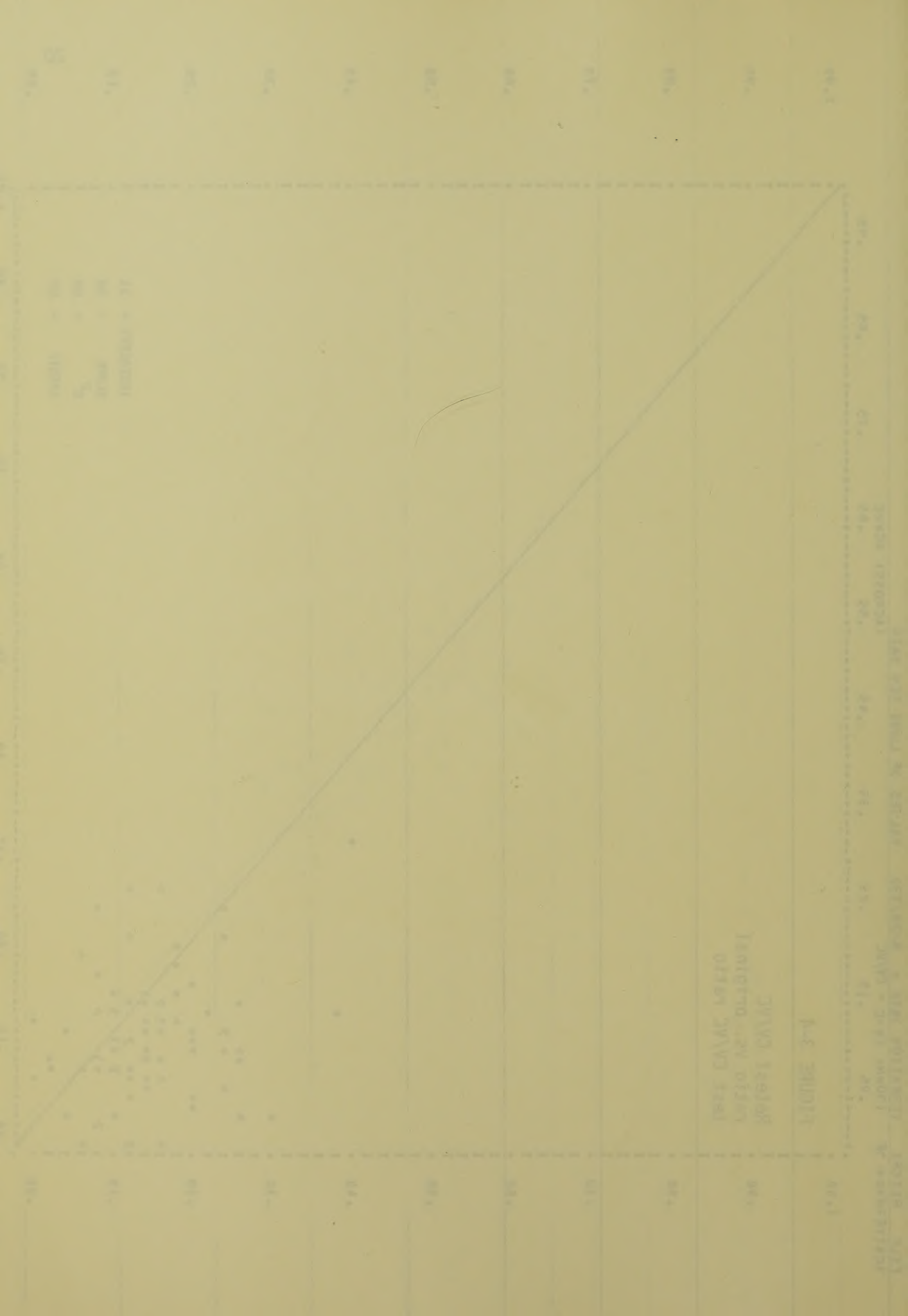

FILE RETEST (CREATION DATE = 8/28/79) VALUES OF LUNG FCV DATA
SCATTERGRAM OF (DOWN) CV/C = CV/VC (ACROSS) RCVVC
.05 .15 .25 .35 .45 .55 .65 .75 .85 .95
1.00 .90 .80 .70 .60 .50 .40 .30 .20 .10 .00
.00 .10 .20 .30 .40 .50 .60 .70 .90 .90 1.00
INTERCEPT = .11
SLOPE = .26
R2 = .04
SIGNIF = .02

FIGURE 3-4

Retest CV/VC ratio vs. original test CV/VC ratio



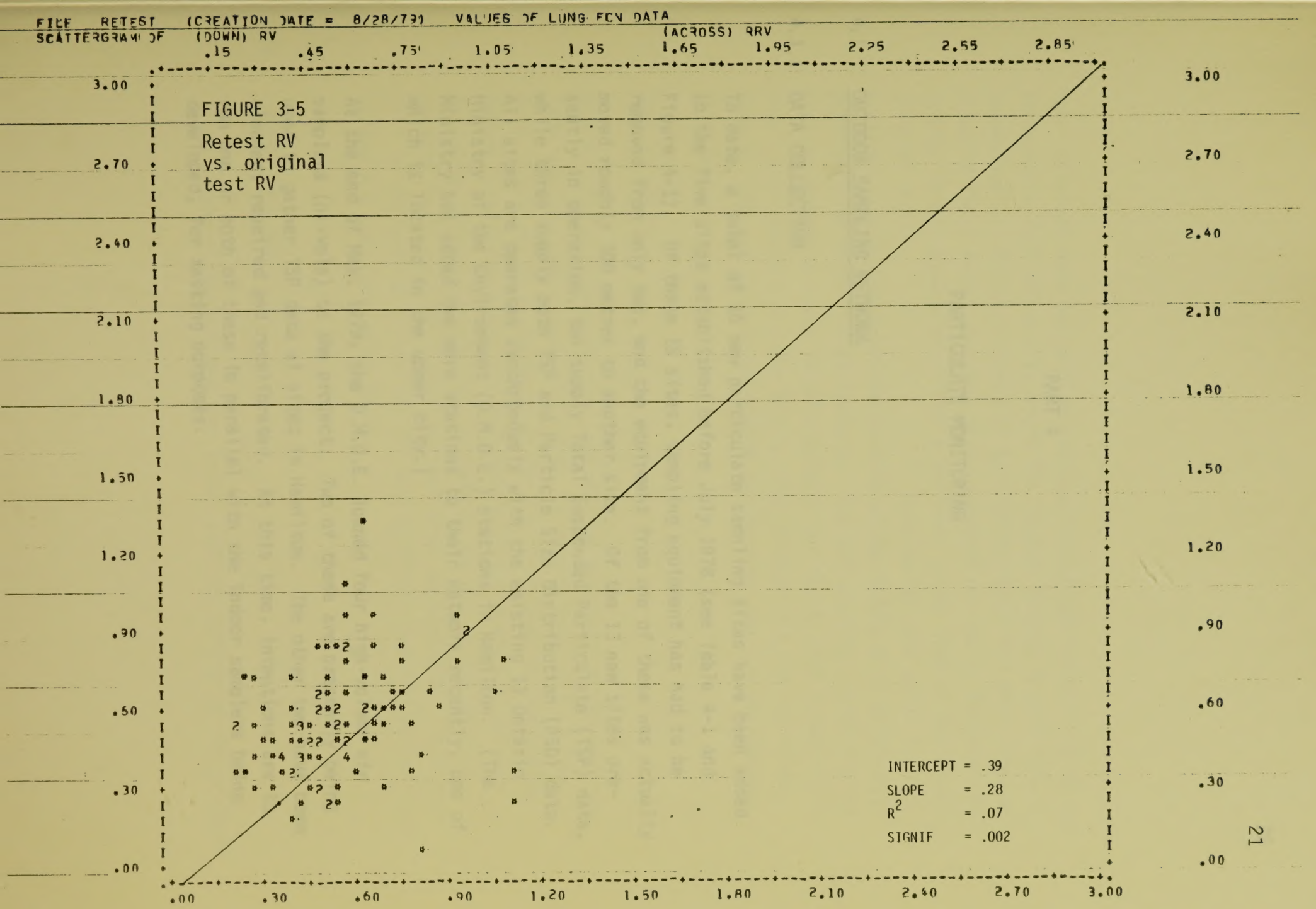


FIGURE 3-5

Retest RV vs. original test RV

PART 4

PARTICULATE MONITORING

4.1 OUTDOOR SAMPLING NETWORK

4.1.1 DATA COLLECTION

To date, a total of 15 new particulate sampling sites have been added to the five sites established before July 1978 (see Table 4-1 and Figure 4-1). Of these 15 sites, sampling equipment has had to be removed from only two, and the equipment from one of these was actually moved roughly 300 metres to another site. Of the 13 new sites presently in operation, ten supply Total Suspended Particulate (TSP) data, while three supply both TSP and Particle Size Distribution (PSD) data. All sites are operated synchronously with the existing 11 Ontario Ministry of the Environment (O.M.O.E.) stations in Hamilton. (The Ministry has added two more stations to their network recently, one of which is located in the upper city.)

At the end of May, 1979, the O.M.O.E. loaned four high-volume air samplers (hi-vols) to the project. Two of these are presently being used to gather TSP data at sites in Hamilton. The other two have been cleaned, repaired and recalibrated. At this time, intentions are to run one or both of these in parallel with the indoor samplers being developed, for testing purposes.

Data collected from the particulate sampling system follow. Tables 4-2 through 4-9 list TSP data by month for January through August 1979, respectively. Geometric means of each month's data for each site are given in Table 4-10. PSD data is illustrated for two of the seven PSD sampler sites, Seneca and Barton & Sanford, in the form of bar graphs (Figure 4-2). Each bar is made up of five sections; the lowest shows the portion of the sample with aerodynamic particle size below 1.1 micrometers. The next section represents the portion between 1.1 and 2.0 micrometers, the third, that between 2.0 and 3.3 micrometers and the fourth, that between 3.3 and 7.0 micrometers. The top section represents the portion over 7.0 micrometers in size.

4.1.2 Quality Control

Quality control procedures are just getting under way on the particulate sampling data collected to date. A recent paper by W. F. Hunt, J. B. Clark and S. K. Goranson of the U.S. Environmental Protection Agency (published in the May 1978 volume of the Journal of the Air Pollution Control Association) recommends the use of the Shewhart Control Chart Test for 24-hour air pollution measurements. This test will be employed to screen the TSP data gathered, and will be employed on the PSD data on a trial basis.

4.2 INDOOR SAMPLING

Since Report #1 was written, the indoor sampling portion of the project

has progressed slowly because the setting up of outdoor sampling was given first priority. However, a constant search for an alternate air pump sufficiently quiet to be placed in residential living areas has been underway since then. Several pumps have been examined, but have proven to be noisier than anticipated. Other pumps have come on the market just recently; information concerning them is being sought. A flow controller is being developed to overcome the variable flow problem mentioned in Report #1.

4.3 GRID REFERENCE SYSTEM AND MAP OF HAMILTON

A grid reference system has been developed to permit matching of pollution gradients with place of residence. This system, as shown on a series of Neighbourhood Maps produced by the Planning and Development Department of the Regional Municipality of Hamilton-Wentworth, is based on the Universal Transverse Mercator grid system. Residences are located on the basis of their postal codes for ease of data manipulation. Schools and sampling sites are located individually.

The map of Hamilton, showing project schools and sampler locations (Figure 4-1), was generated by a program written for McMaster's CDC 6400 Computer System using the Versatec 1200A plotter accessory. By means of simple modification to this program, information of many types can be displayed on the map; for example, the grid reference lines mentioned above could be superimposed on it, and differences in air quality could be shown by hatching of appropriate areas.

On the map shown in Figure 4-1, five main symbols are used to locate the project schools and four of the air sampler systems in the city. The circles shown are drawn around many of the particulate samplers in Hamilton. They represent arbitrary areas of coverage for particulate data, one kilometer in radius.

FIGURE 4-1

MAP OF HAMILTON SHOWING SAMPLER SITE AND SCHOOL LOCATIONS

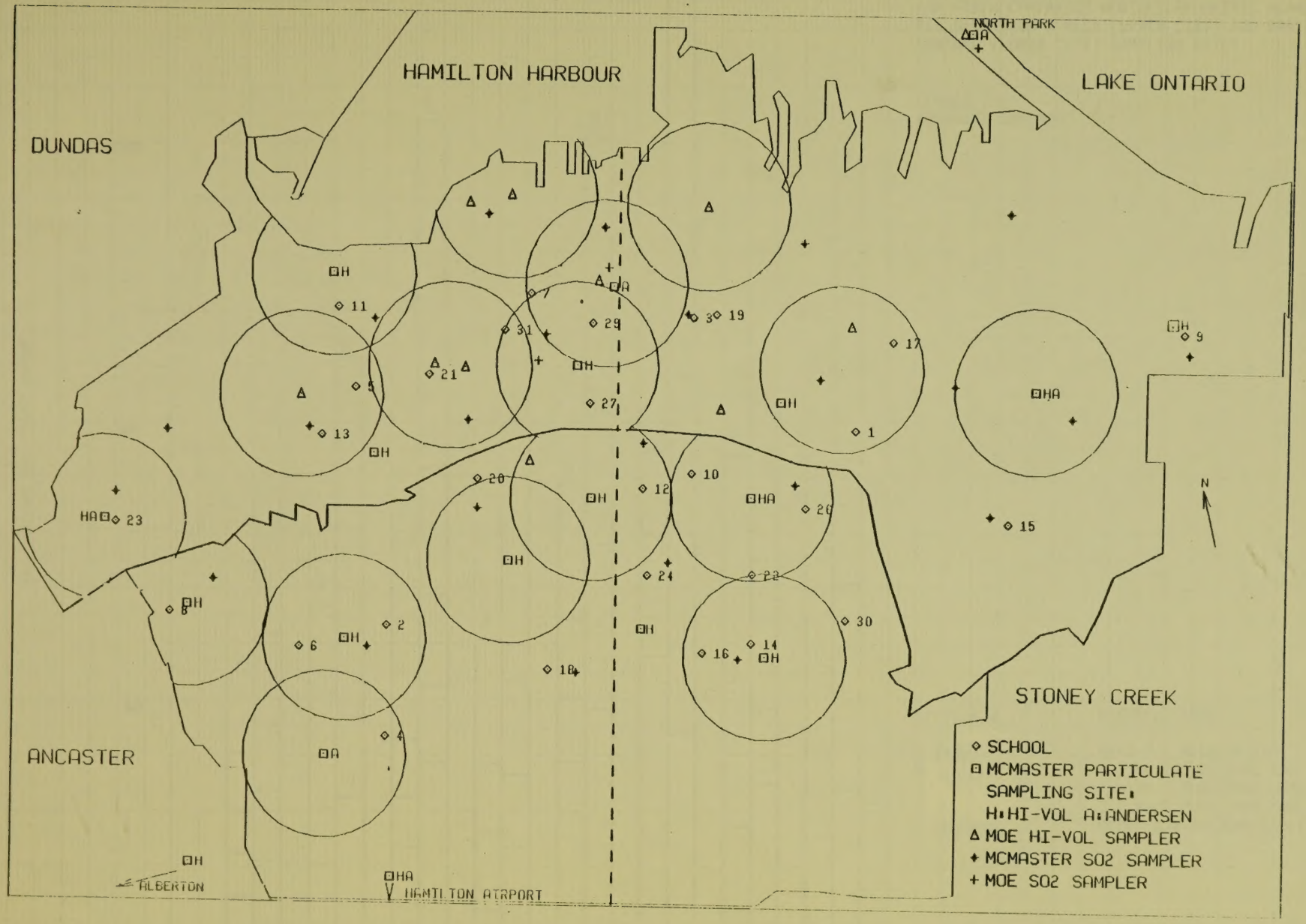
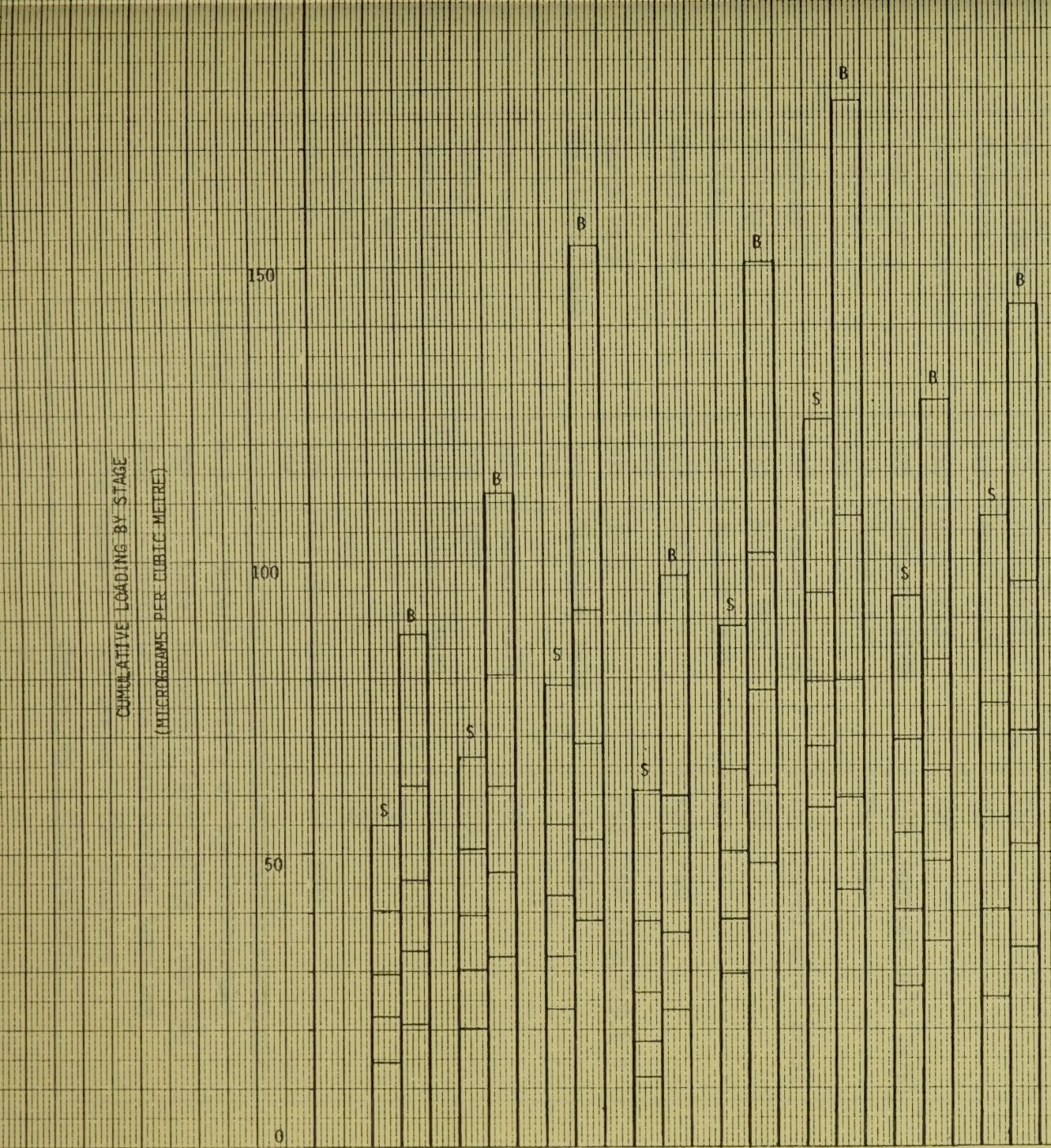


FIGURE 4-2

BAR GRAPH COMPARING MONTHLY GEOMETRIC MEANS OF PSD DATA FROM SENECA (UPPER CITY) AND BARTON & SANFORD (LOWER CITY) SAMPLING SITES

SENECA : S
BARTON & SANFORD : B



SECTION #	PARTICLE SIZE
5 (top)	OVER 7.0 MICROMETERS
4	3.3 to 7.0 MICROMETERS
3	2.0 to 3.3 MICROMETERS
2	1.1 to 2.0 MICROMETERS
1 (bottom)	UNDER 1.1 MICROMETERS

TABLE 4-1

PARTICULATE SAMPLING STATIONS - HAMILTON NETWORK

SITE	SITE NO.	ESTABLISHED	COMMENTS
Aberdeen	106	January 1979	TSP
Alberton	101	1975	TSP
Barton & Sanford	202	1976	PSD (TSP from M.O.E.)
Bishopsgate	115	July 1979	TSP
Cathedral Girl's	112	April 1979	TSP
Dundurn Castle	116	July 1979	TSP
Gage Park	105	January 1979	TSP (Removed July 1979)
Highview	110, 207	March 1979	TSP, PSD
McElroy I	107	January 1979	TSP (Moved April 1979)
McElroy II	113	April 1979	TSP
M.O.E.	117	August 1979	TSP
Mount Hope	102, 201	1975	TSP, PSD
North Park	203	1976	PSD (TSP from M.O.E.)
Red Hill Creek	109, 205	February 1979	TSP, PSD
San Diego	103	January 1979	TSP
Seneca	204	1977	PSD
Upper Ottawa	104	January 1979	TSP
Upper Wentworth	111	March 1979	TSP
Westmount	114	June 1979	TSP
Whitney	108, 206	February 1979	TSP, PSD

NOTES: M.O.E. - Ontario Ministry of the Environment
TSP - Total Suspended Particulate Sampling
PSD - Particle Size Distribution Sampling
Site Numbers - 100 Series : TSP Samplers
200 Series : PSD Samplers

TABLE 4-2

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

January 1979

STATION NUMBER	STATION NAME	ESTBD	3- 1-79	9- 1-79	15- 1-79	21- 1-79	27- 1-79
101	ALBERTON	06-75	44.	68.	24.	24.	22.
102	MOUNT HOPE	06-75	56.	73.	32.	0.	30.
103	SAN DIEGO	12-78	51.	83.	30.	32.	28.
104	UPPER OTTAWA	01-79	0.	75.	24.	39.	29.
105	GAGE PARK I	01-79	0.	83.	29.	54.	32.
106	ABERDEEN	01-79	0.	0.	0.	30.	27.
107	MCELROY I	01-79	0.	0.	0.	0.	37.

Note: 0 values indicate no sample for that day

TABLE 4-3

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

February 1979

STATION NUMBER	STATION NAME	ESTBD	2- 2-79	8- 2-79	14- 2-79	20- 2-79	26- 2-79
101	ALBERTON	06-75	16.	22.	32.	65.	30.
102	MOUNT HOPE	06-75	16.	22.	54.	80.	54.
103	SAN DIEGO	12-78	22.	29.	46.	67.	31.
104	UPPER OTTAWA	01-79	21.	26.	0.	77.	53.
105	GAGE PARK 1	01-79	35.	31.	65.	83.	56.
106	ABERDEEN	01-79	36.	43.	55.	70.	40.
107	MCELROY I	01-79	30.	28.	42.	68.	45.
108	WHITNEY	02-79	0.	0.	0.	99.	28.
109	RED HILL CREEK	02-79	0.	0.	0.	78.	40.

Note: 0 values indicate no sample available for that day.

TABLE 4-4

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

March 1979

STATION NUMBER	STATION NAME	ESTD	4- 3-79	10- 3-79	16- 3-79	22- 3-79	28- 3-79
101	ALBERTON	06-75	24.	32.	55.	99.	32.
102	MOUNT HOPE	06-75	29.	42.	59.	131.	44.
103	SAN DIEGO	12-78	30.	40.	54.	190.	51.
104	UPPER OTTAWA	01-79	26.	40.	48.	190.	39.
105	GAGE PARK I	01-79	30.	64.	86.	146.	39.
106	ABERDEEN	01-79	34.	49.	74.	243.	66.
107	MCELROY I	01-79	0.	61.	66.	168.	46.
108	WHITNEY	02-79	50.	68.	76.	0.	63.
109	RED HILL CREEK	02-79	27.	34.	49.	134.	37.
110	HIGHVIEW	03-79	30.	57.	78.	158.	49.
111	UPPER WENTWORTH	03-79	0.	0.	94.	0.	55.

Note: 0 values indicate no sample available for that day

TABLE 4-5

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

April 1979

STATION NUMBER	STATION NAME	ESTBD	3- 4-79	9- 4-79	15- 4-79	21- 4-79	27- 4-79
101	ALBERTON	06-75	21.	21.	18.	95.	0.
102	MOUNT HOPE	06-75	54.	47.	24.	86.	25.
103	SAN DIEGO	12-78	24.	51.	23.	133.	26.
104	UPPER OTTAWA	01-79	39.	53.	22.	98.	20.
105	GAGE PARK I	01-79	48.	53.	35.	256.	30.
106	ABERDEEN	01-79	30.	41.	30.	171.	31.
107	MCELROY I	01-79	32.	46.	27.	0.	0.
108	WHITNEY	02-79	32.	27.	21.	163.	27.
109	RED HILL CREEK	02-79	29.	27.	29.	93.	28.
110	HIGHVIEW	03-79	0.	0.	36.	121.	31.
111	UPPER WENTWORTH	03-79	48.	51.	31.	133.	29.
112	CATHEDRAL GIRLS	03-79	0.	70.	59.	160.	59.
113	MCELROY II	04-79	0.	0.	0.	109.	37.

Note: 0 values indicate no sample available for that day

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

May 1979

STATION NUMBER	STATION NAME	ESTBD	3- 5-79	9- 5-79	15- 5-79	21- 5-79	27- 5-79
101	ALBERTON	06-75	54.	130.	29.	82.	45.
102	MOUNT HOPE	06-75	57.	0.	31.	80.	48.
103	SAN DIEGO	12-78	0.	96.	26.	80.	48.
104	UPPER OTTAWA	01-79	42.	95.	26.	67.	47.
105	GAGE PARK I	01-79	57.	108.	29.	74.	55.
106	ABERDEEN	01-79	101.	104.	36.	71.	53.
108	WHITNEY	02-79	68.	108.	27.	76.	56.
109	RED HILL CREEK	02-79	38.	108.	24.	66.	44.
110	HIGHVIEW	03-79	55.	82.	29.	81.	48.
111	UPPER WENTWORTH	03-79	78.	98.	34.	79.	45.
112	CATHEDRAL GIRLS	03-79	122.	178.	48.	100.	81.
113	MCELROY II	04-79	82.	118.	33.	82.	0.

Note: 0 values indicate no sample available for that day

TABLE 4-7

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

STATION NUMBER	STATION NAME	ESTBD	JUNE 1979 2- 6-79	8- 6-79	14- 6-79	20- 6-79	26- 6-79
101	ALBERTON	06-75	58.	32.	61.	0.	48.
102	MOUNT HOPE	06-75	67.	81.	93.	58.	47.
103	SAN DIEGO	12-78	75.	112.	80.	95.	0.
104	UPPER OTTAWA	01-79	54.	86.	67.	77.	59.
105	GAGE PARK I	01-79	104.	95.	74.	202.	79.
106	ABERDEEN	01-79	70.	106.	70.	175.	100.
108	WHITNEY	02-79	65.	101.	68.	148.	69.
109	RED HILL CREEK	02-79	54.	89.	60.	77.	63.
110	HIGHVIEW	03-79	71.	94.	88.	94.	0.
111	UPPER WENTWORTH	03-79	66.	90.	107.	0.	0.
112	CATHEDRAL GIRLS	03-79	88.	129.	88.	204.	142.
113	MCELROY II	04-79	70.	86.	72.	102.	65.
114	WESTMOUNT	06-79	0.	0.	82.	100.	61.

Note: 0 values indicate no sample available for that day

TABLE 4-8

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

STATION NUMBER	STATION NAME	ESTBD	JULY 1979 2- 7-79	8- 7-79	14- 7-79	20- 7-79	26- 7-79
101	ALBERTON	06-75	30.	62.	96.	92.	0.
102	MOUNT HOPE	06-75	38.	84.	112.	0.	0.
103	SAN DIEGO	12-78	33.	50.	105.	81.	40.
104	UPPER OTTAWA	01-79	34.	45.	94.	84.	38.
105	GAGE PARK I	01-79	38.	0.	0.	0.	0.
106	ABERDEEN	01-79	39.	54.	121.	90.	48.
108	WHITNEY	02-79	50.	59.	105.	92.	0.
109	RED HILL CREEK	02-79	38.	54.	102.	88.	50.
110	HIGHVIEW	03-79	39.	61.	108.	104.	43.
111	UPPER WENTWORTH	03-79	41.	58.	122.	103.	51.
112	CATHEDRAL GIRLS	03-79	53.	81.	148.	122.	67.
113	MCELROY II	04-79	0.	0.	118.	114.	47.
114	WESTMOUNT	06-79	41.	55.	111.	88.	33.
115	BISHOPSGATE	07-79	0.	0.	0.	0.	0.
116	DUNDURN CASTLE	07-79	0.	0.	0.	0.	50.

Note: 0 values indicate no sample available for that day

TABLE 4-9

PARTICULATE POLLUTION IN THE HAMILTON AREA

MONTHLY LIST OF TOTAL LOAD DATA

(ALL VALUES IN MICROGRAMS PER CUBIC METRE)

AUGUST 1979

STATION NUMBER	STATION NAME	ESTB	1- 8-79	7- 8-79	13- 8-79	19- 8-79	25- 8-79	31- 8-79
101	ALBERTON	06-73	0.	0.	0.	38.	42.	53.
102	MOUNT HOPE	06-73	89.	0.	0.	46.	45.	66.
103	SAN DIEGO	12-73	51.	60.	48.	56.	37.	85.
104	UPPER OTTAWA	01-73	53.	58.	55.	55.	39.	56.
106	ABERDEEN	01-73	58.	64.	53.	68.	46.	95.
108	WHITNEY	02-73	0.	68.	46.	61.	47.	95.
109	RED HILL CREEK	02-73	0.	54.	46.	50.	45.	57.
110	HIGHVIEW	03-73	64.	68.	62.	58.	45.	71.
111	UPPER WENTWORTH	03-73	71.	61.	57.	64.	46.	79.
112	CATHEDRAL GIRLS	03-73	87.	81.	78.	89.	62.	118.
113	MCELROY II	04-73	67.	73.	2.	60.	49.	84.
114	WESTMOUNT	06-73	65.	56.	43.	57.	41.	89.
115	BISHOPSGATE	07-73	65.	56.	56.	61.	74.	76.
116	DUNDURN CASTLE	07-73	39.	68.	52.	58.	42.	46.
117	MINISTRY OF THE ENVIRONMENT		0.	0.	0.	0.	59.	0.

TABLE 4-10

MONTHLY GEOMETRIC MEANS - TSP 1979

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.
UPPER CITY								
San Diego	41	36	57	40	56	89	56	54
Upper Ottawa	38	39	47	38	51	68	54	52
McElroy	(37)	40	75	43	71	78	86	63
Highview			64	52	55	86	65	61
Upper Wentworth			(55)	49	62	86	68	62
Westmount						80	59	57
Bishopsgate								64
LOWER CITY								
Gage Park	45	50	63	58	59	103	(38)	
Aberdeen	28	47	72	46	68	98	65	62
Whitney		52	63	38	61	86	73	61
Red Hill Creek		56	47	36	49	68	62	50
Cathedral Girls				79	97	128	88	84
Dundurn Castle							(50)	50
M.O.E.								(59)

Units: Micrograms per cubic metre

Values in parentheses represent single samples obtained during that month

PART 5

SULPHUR DIOXIDE MONITORING

5.1 SAMPLING NETWORK AND SCHEDULING

Many additions and changes have been incorporated into the SO_2 monitoring effort since the Report#1. The stations monitored from January to April were:

1) Macassa Lodge - Upper Sherman Ave. and Fennell Rd. E.

2) Sir John A. MacDonald High School - Cannon St. W. and Bay St. S.

3) Chedoke Hospital - Rice Rd and Mohawk Rd.

We acquired three more analysers (Beckman 906) from the Provincial Ministry of the Environment (MOE) during the month of July, and purchased two additional units (one each of Beckman 906 and 953). These were used to set up additional stations.

The original proposal for rotating the stations on a monthly basis has been found to be infeasable due to the large amount of time required. We have found it more satisfactory, from the standpoint of time and data reliability, to rotate monitoring on a three month basis.

A single monitoring period has been completed for the following:

1)	Chedoke Hospital	(Jan. '79 - May '79)	West Mountain
2)	Macassa Lodge	(Jan. '79 - May '79)	East Mountain
3)	Sir John A. MacDonald	(Mar. '79 - May '79)	North West Hamilton

Presently, we have the following stations in operation:

1)	Westmount High School	(as of July '79)	West Mountain
2)	Sir Winston Churchill High School	(as of July '79)	East Mountain
3)	Sherwood High School	(as of July '79)	East Mountain
4)	Centennial Public School	(as of Sept.'79)	North Central Hamilton
5)	Southmount High School	(as of Sept.'79)	South Central Mountain
6)	McMaster Medical Centre	(as of Sept.'79)	West Hamilton
7)	Henderson Hospital	(as of Sept.'79)	North Central Mountain

They have been carefully selected so as to maintain a representative distribution of sulphur dioxide data throughout the city. Approximate positions of these stations are marked on Fig. 5-13.

5.2 PRELIMINARY DATA ANALYSIS

Programmes have been written for the CDC 6400 computer to correlate weather data with the sulphur dioxide readings. (Given in Appendix 5-1). Data on SO_2 concentration, temperature, wind direction and wind speed have been collected and plotted in Fig. 5-1 through 5-12. As expected, the data show that wind direction and wind speed are important factors contributing to sulphur dioxide dispersion.

Monthly sulphur dioxide levelsfrom mountain stations reveal a strong correlation between extreme readings and wind direction. These effects are most noticeable when there are north-easterly winds. These tend to distribute SO_2 over all of the South end, especially the Southwest. However, for the same stations we have observed that under certain conditions (low wind speed and relatively high temperatures) an opposite Southwest wind direction coincides with a high SO_2 reading. We interpret this interesting observation as resulting either from pollution from outside the city, or pollution from within Hamilton carried by local convection currents existing between the mountain and Lake Ontario.

5.3 CALIBRATION AND INSTRUMENTATION

We now have six Beckman 906 chemical SO_2 analysers and one fluorescent Beckman analyser 953. The 953 is in Southmount High School, where the low pollution levels require the accuracy of this instrument. The 953 analyser can detect lower pollution levels than the 906. This capability provides a basis on which to compare the significantly superior Laser Absorption Spectrometer (LAS) developed at McMaster.

As has been mentioned in the previous Report, the SO_2 analysers employed by the MOE (Beckman 906) were not originally intended for low level measurements with any high degree of accuracy, and suffer from calibration and stability problems. Fortunately, it is possible to deploy the Beckman instruments to monitor relatively low levels of SO_2 by

careful and frequent calibration of the instruments against the LAS. This calibration stage of our project is now well under way. At this time we continue to perform calibrations in the Air Pollution Laboratory where the LAS prototype is kept.

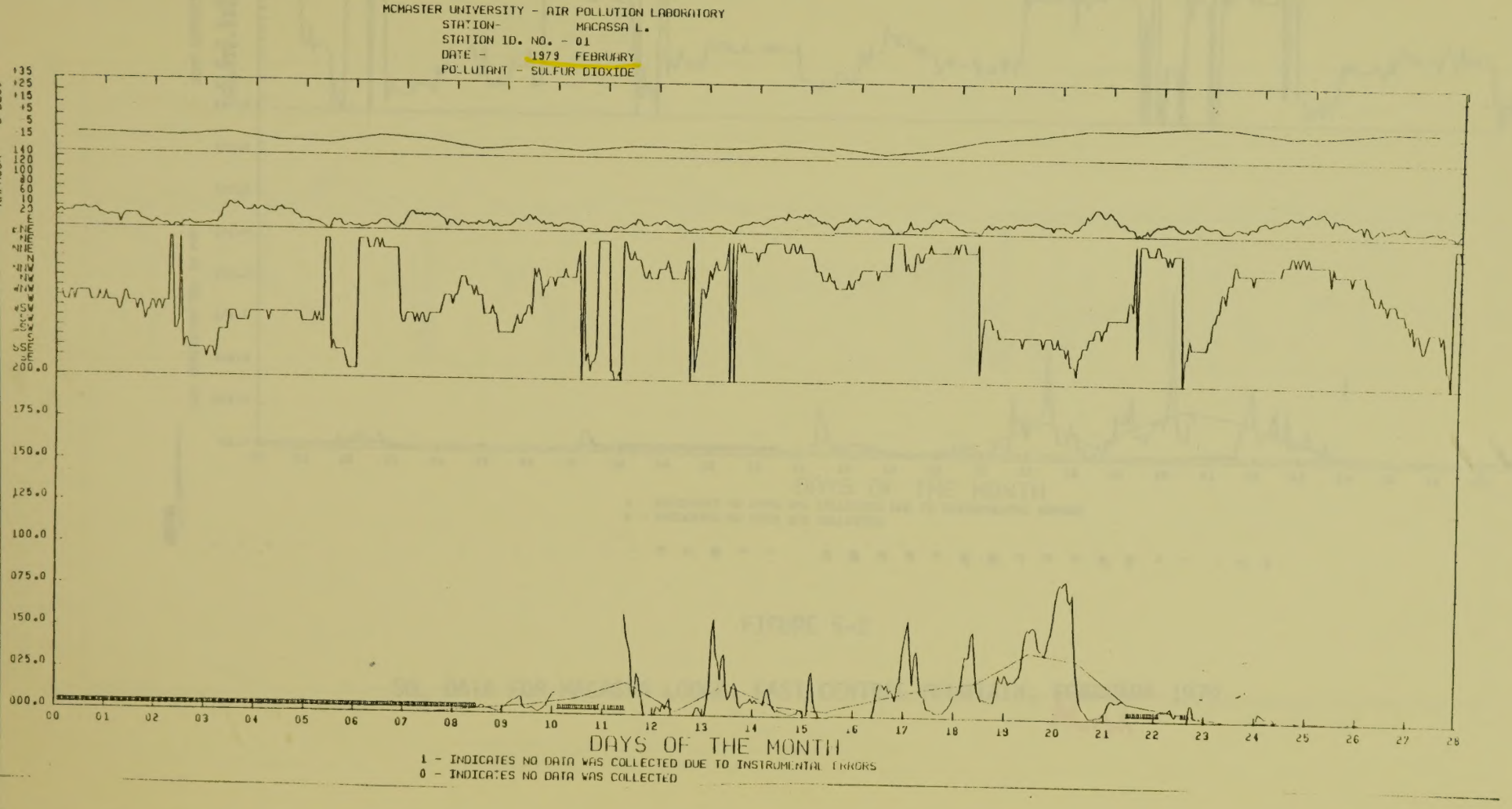
A field test of the LAS has been scheduled for October 1979, to take place at the Sir John A. McDonald High School.

5.4 SUMMARY

The above is a brief description of our activities to September 1979. In summary, we have begun data analysis, including correlation of SO_2 data with weather data. New stations have been established, bringing to seven the number of SO_2 monitoring stations in operation at present.

FIGURE 5-1

SO_2 DATA FOR MACASSA LODGE; EAST CENTRAL MOUNTAIN; FEBRUARY 1979


MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- MACASSA L.
STATION ID. NO. - 01
DATE - 1979 FEBRUARY
POLLUTANT - SULFUR DIOXIDE
200.0
175.0
150.0
125.0
100.0
075.0
050.0
025.0
000.0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

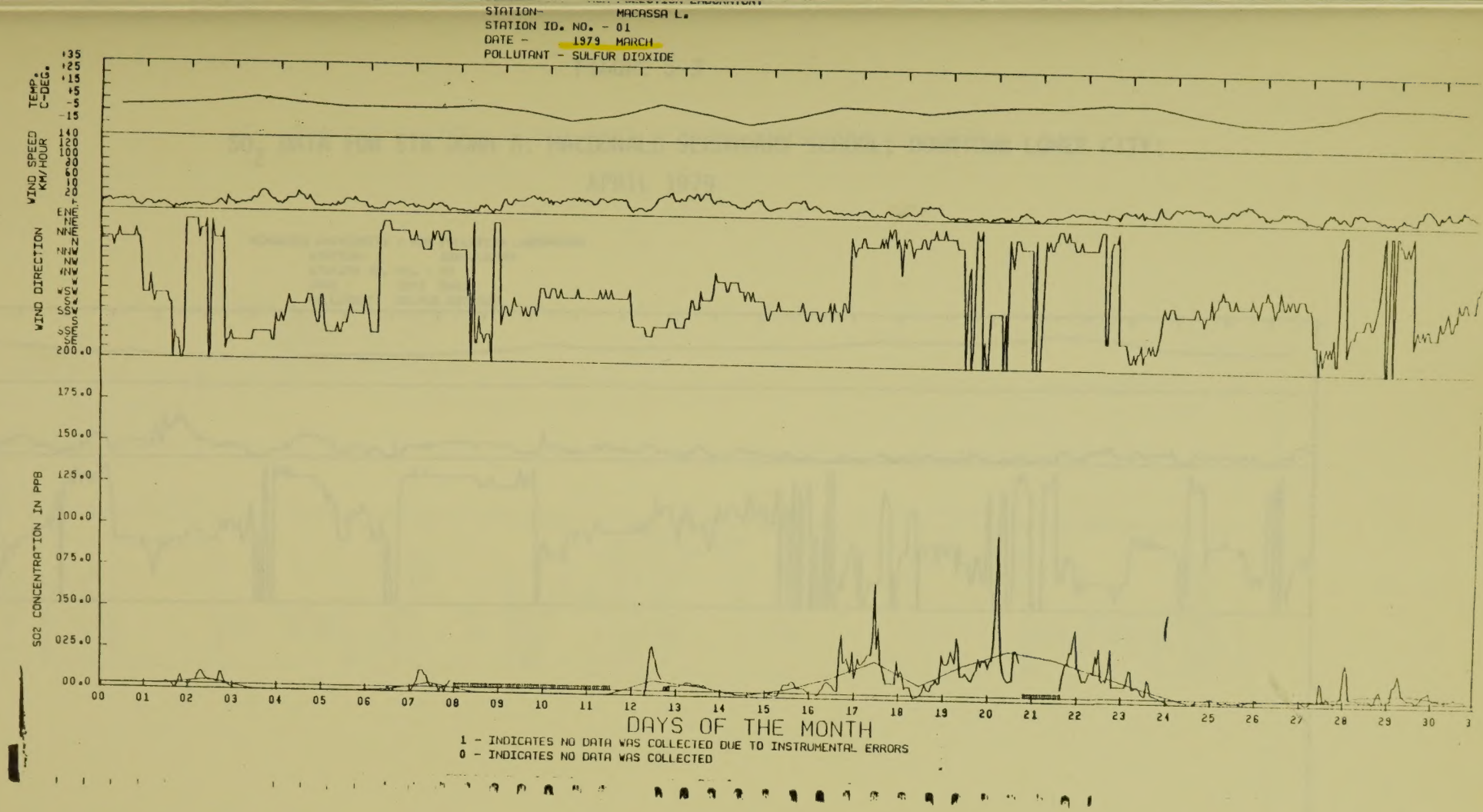

STATION- MACASSA L.
STATION ID. NO. - 01
DATE - 1979 MARCH
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

FIGURE 5-2

SO_2 DATA FOR MACASSA LODGE; EAST CENTRAL MOUNTAIN; ~~FEBRUARY~~ March 1979

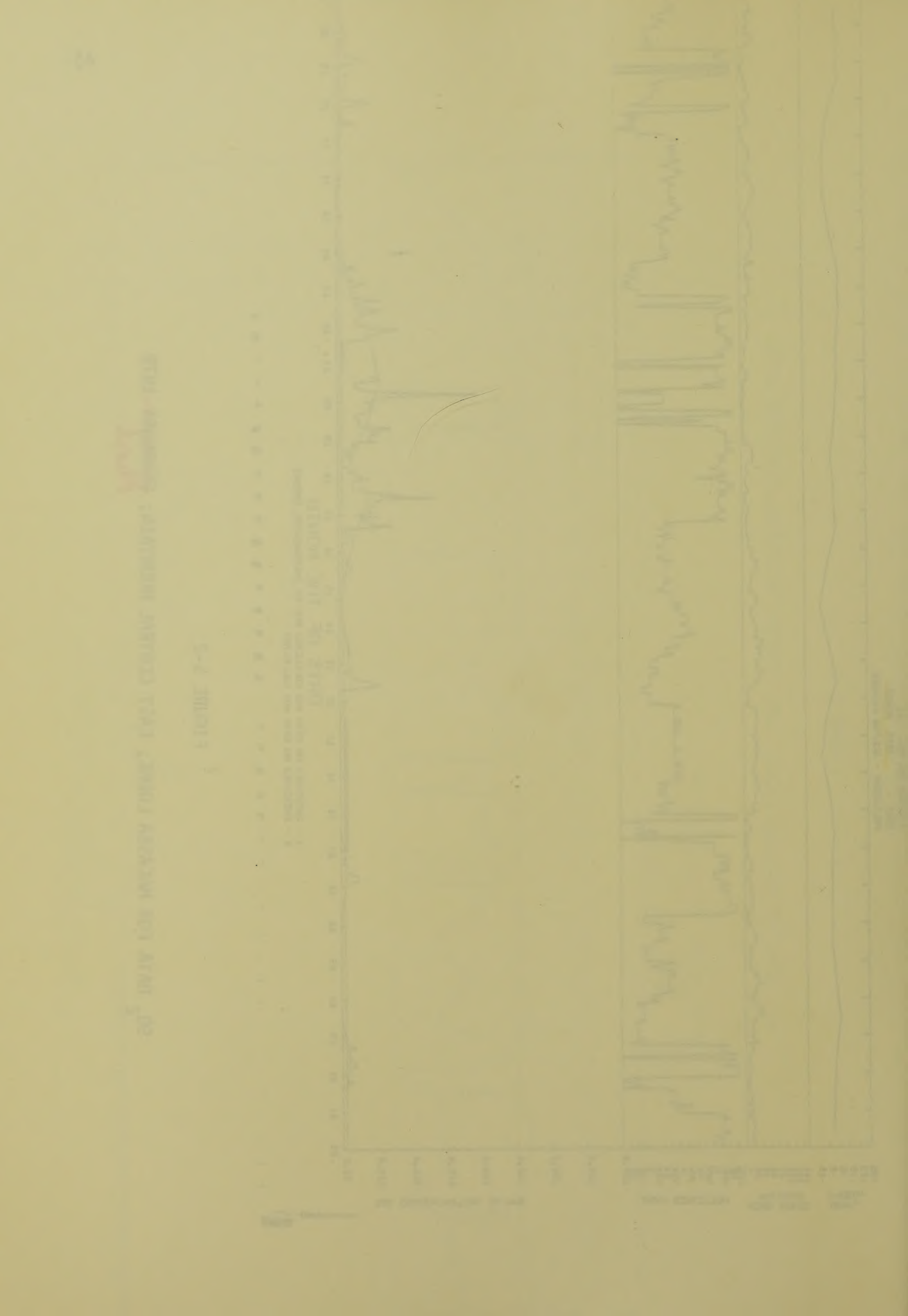
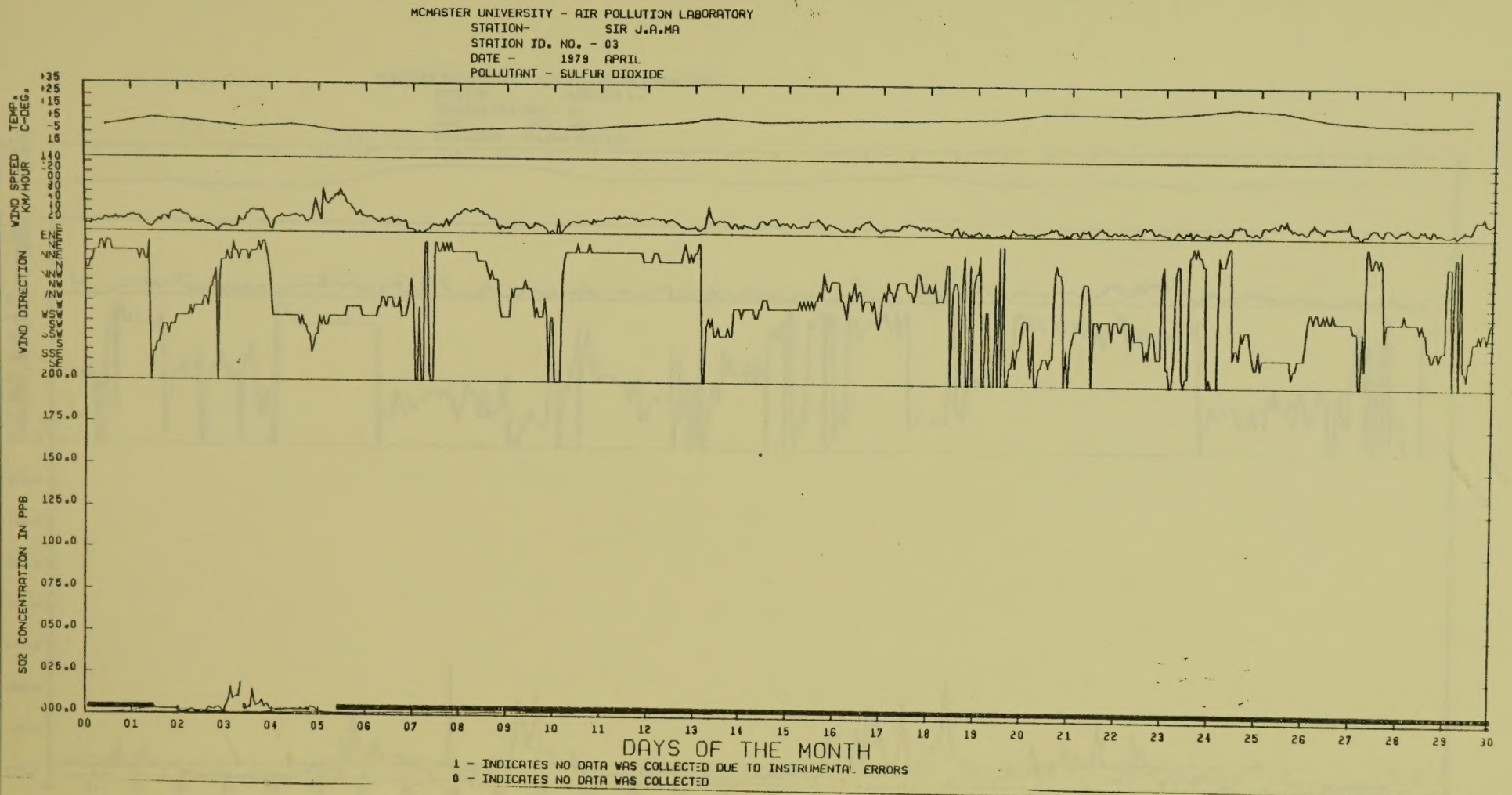


FIGURE 5-3

SO_2 DATA FOR SIR JOHN A. MACDONALD SECONDARY SCHOOL; DOWNTOWN LOWER CITY; APRIL 1979


MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- SIR J.A.MA
STATION ID. NO. - 03
DATE - 1979 APRIL
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
175.0
150.0
125.0
100.0
075.0
050.0
025.0
000.0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

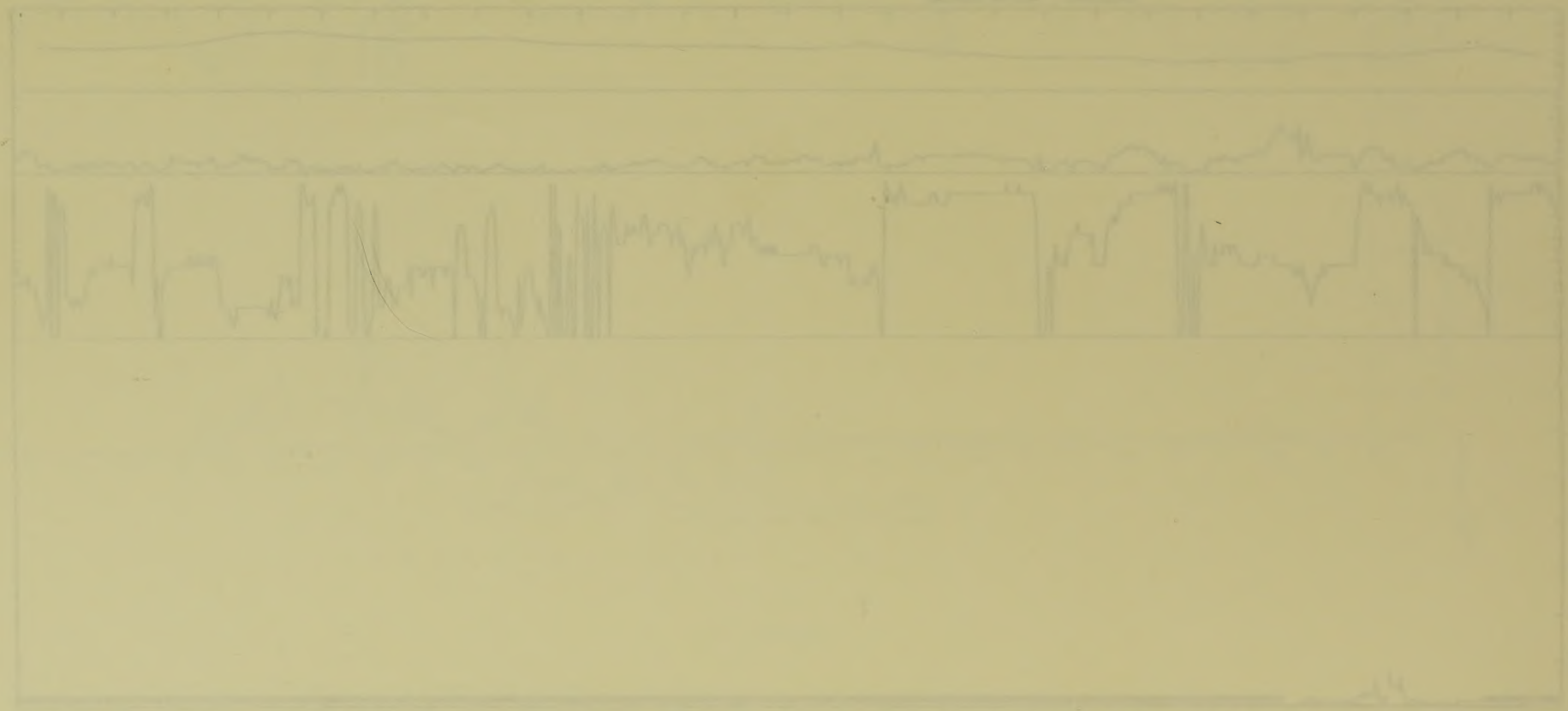


FIGURE 5-4

SO_2 DATA FOR MACASSA LODGE; EAST CENTRAL MOUNTAIN; MAY 1979

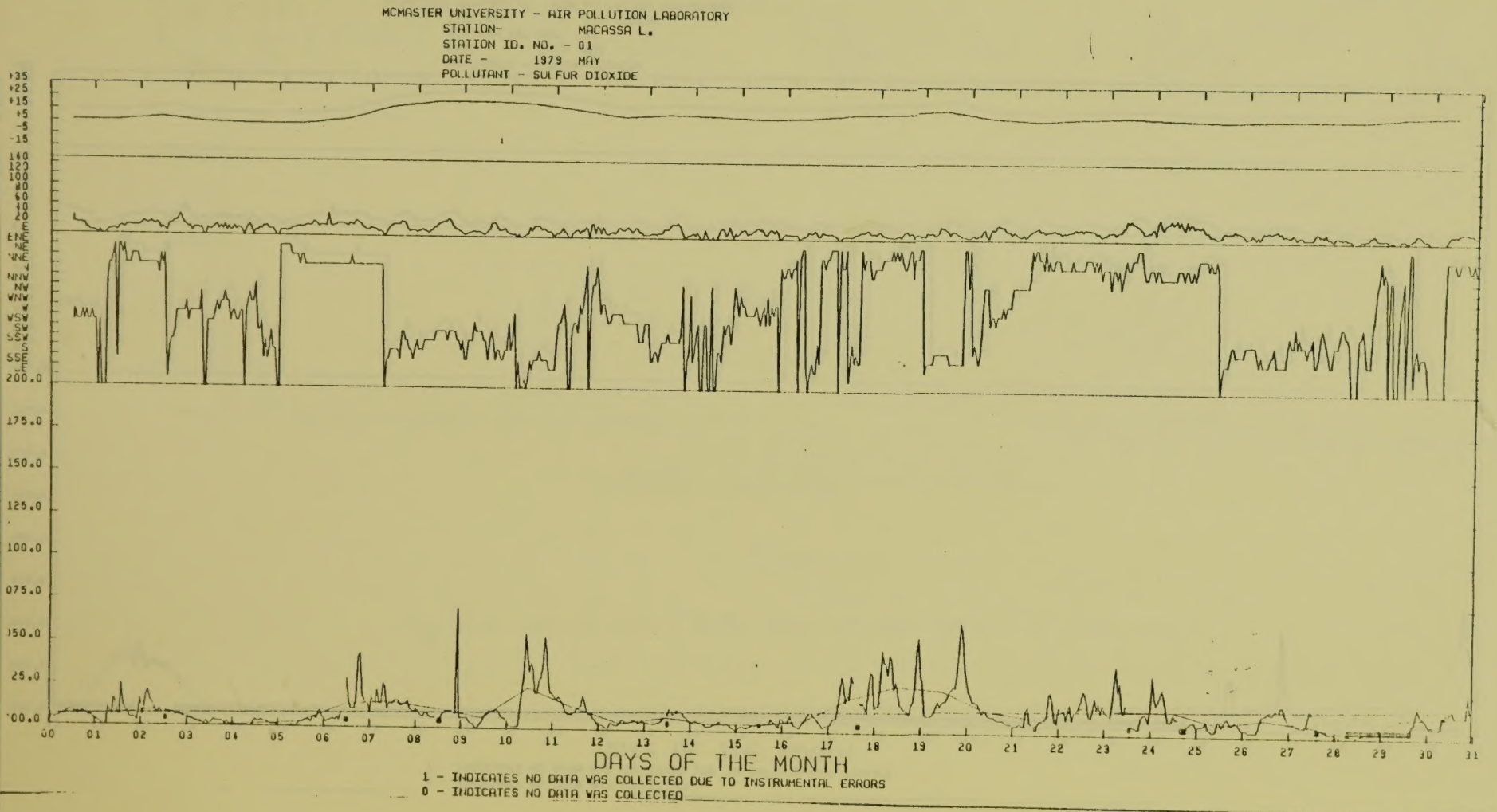
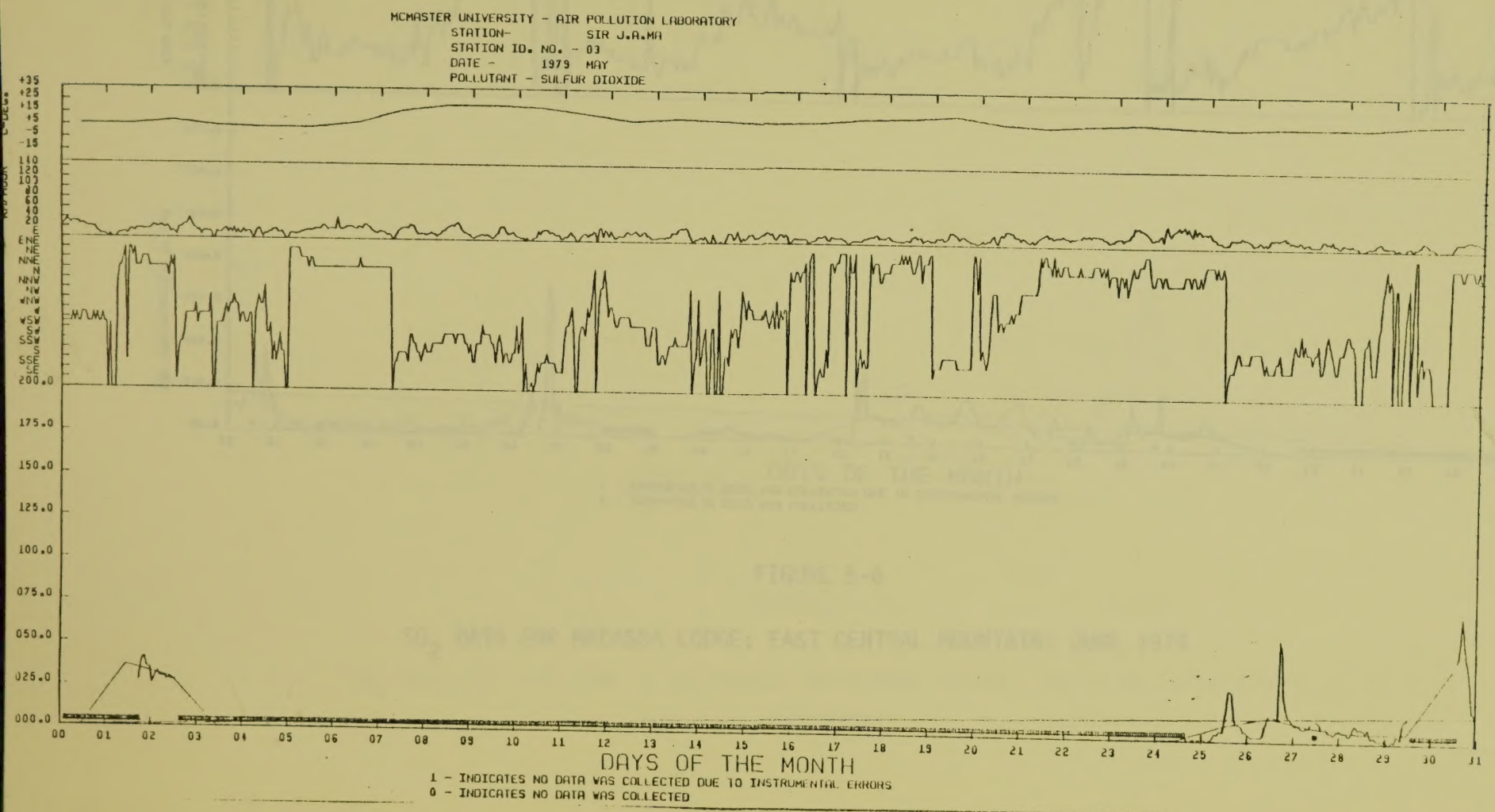

MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- MACASSA L.
STATION ID. NO. - 01
DATE - 1979 MAY
POLLUTANT - SULFUR DIOXIDE
200.0
175.0
150.0
125.0
100.0
075.0
050.0
25.0
00.0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

FIGURE 5-5

SO_2 DATA FOR SIR JOHN A. MACDONALD SECONDARY SCHOOL; DOWNTOWN LOWER CITY;
May 1979


MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- SIR J.A.MA
STATION ID. NO. - 03
DATE - 1979 MAY
POLLUTANT - SULFUR DIOXIDE
200.0
175.0
150.0
125.0
100.0
075.0
050.0
025.0
000.0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

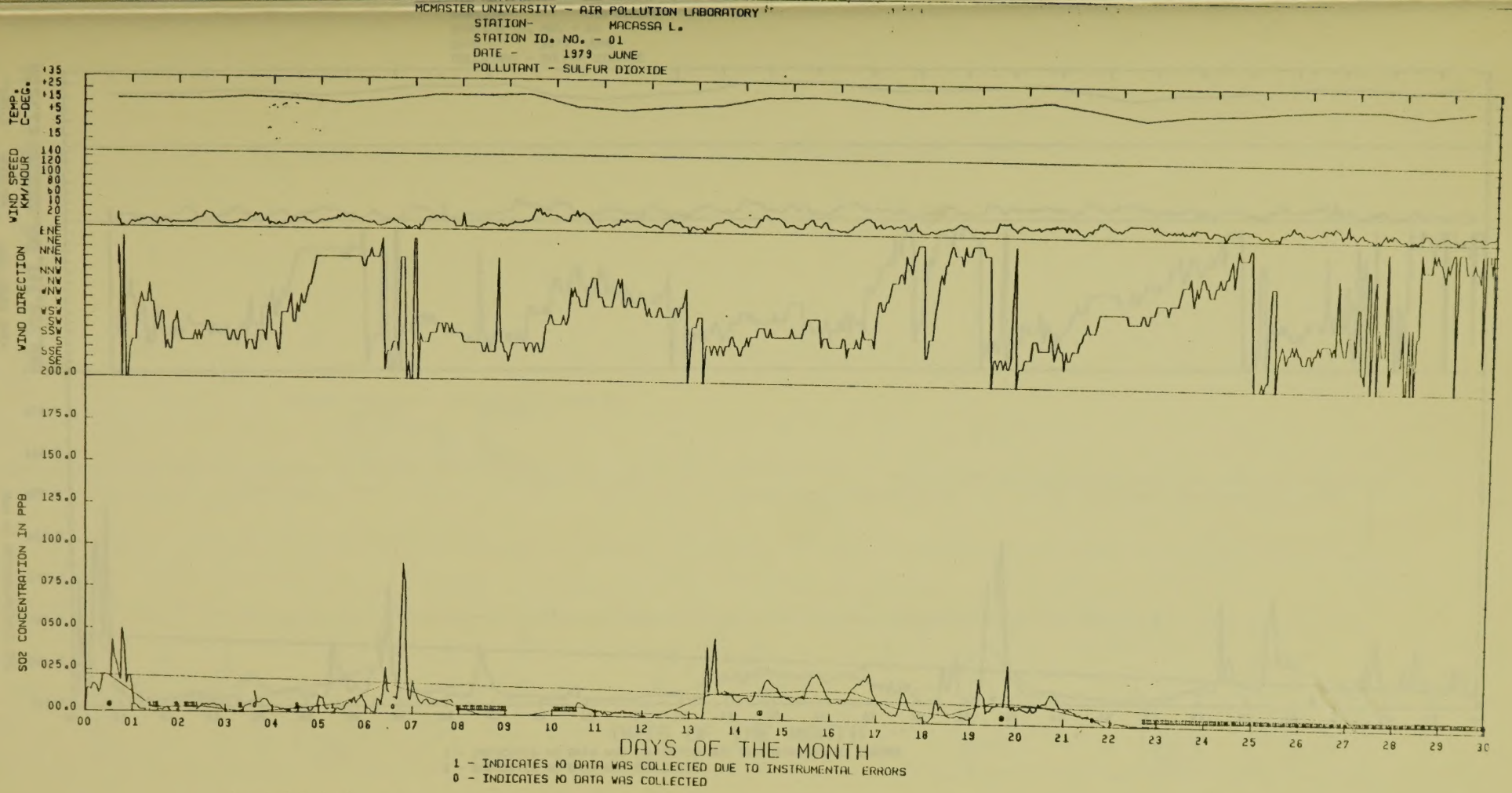
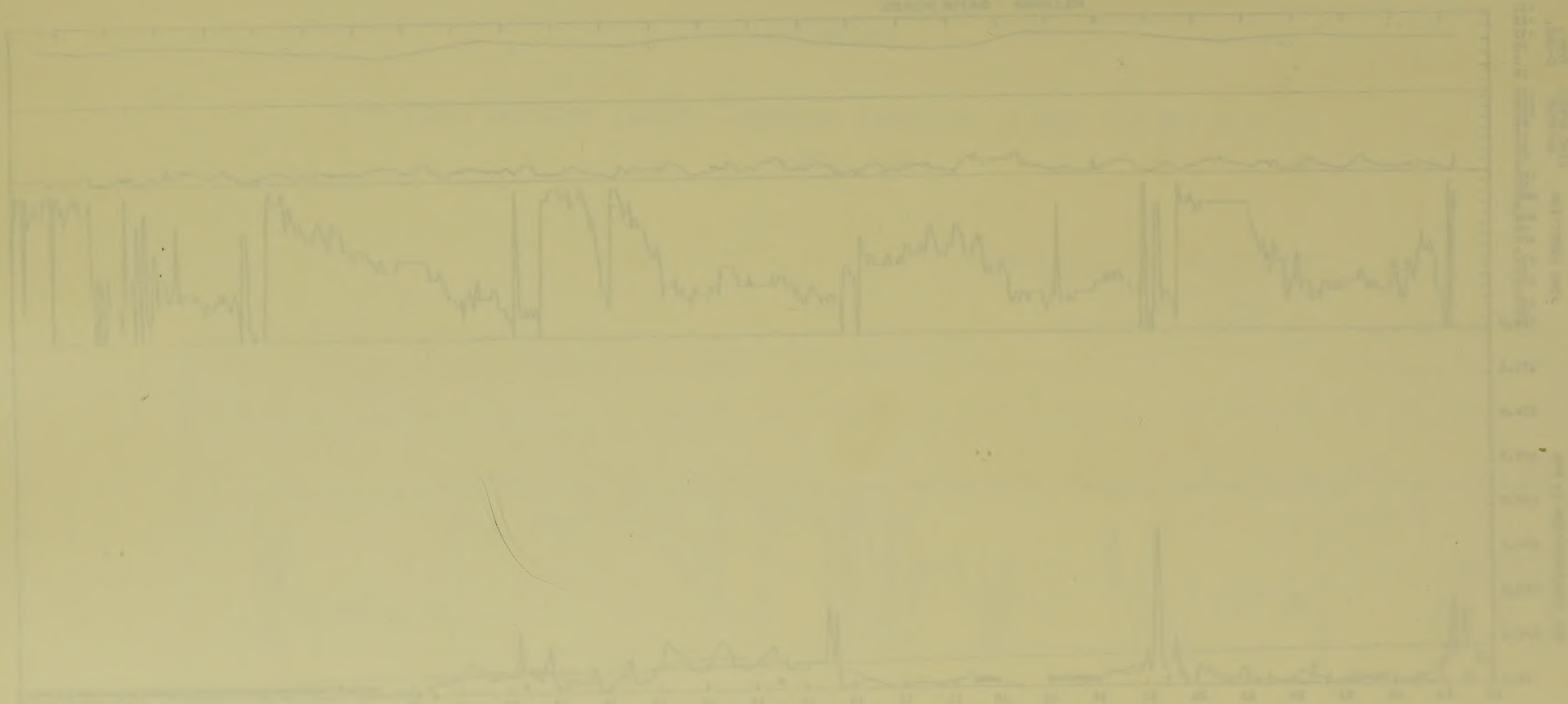

MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- MACASSA L.
STATION ID. NO. - 01
DATE - 1979 JUNE
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

FIGURE 5-6

SO_2 DATA FOR MACASSA LODGE; EAST CENTRAL MOUNTAIN; JUNE 1979



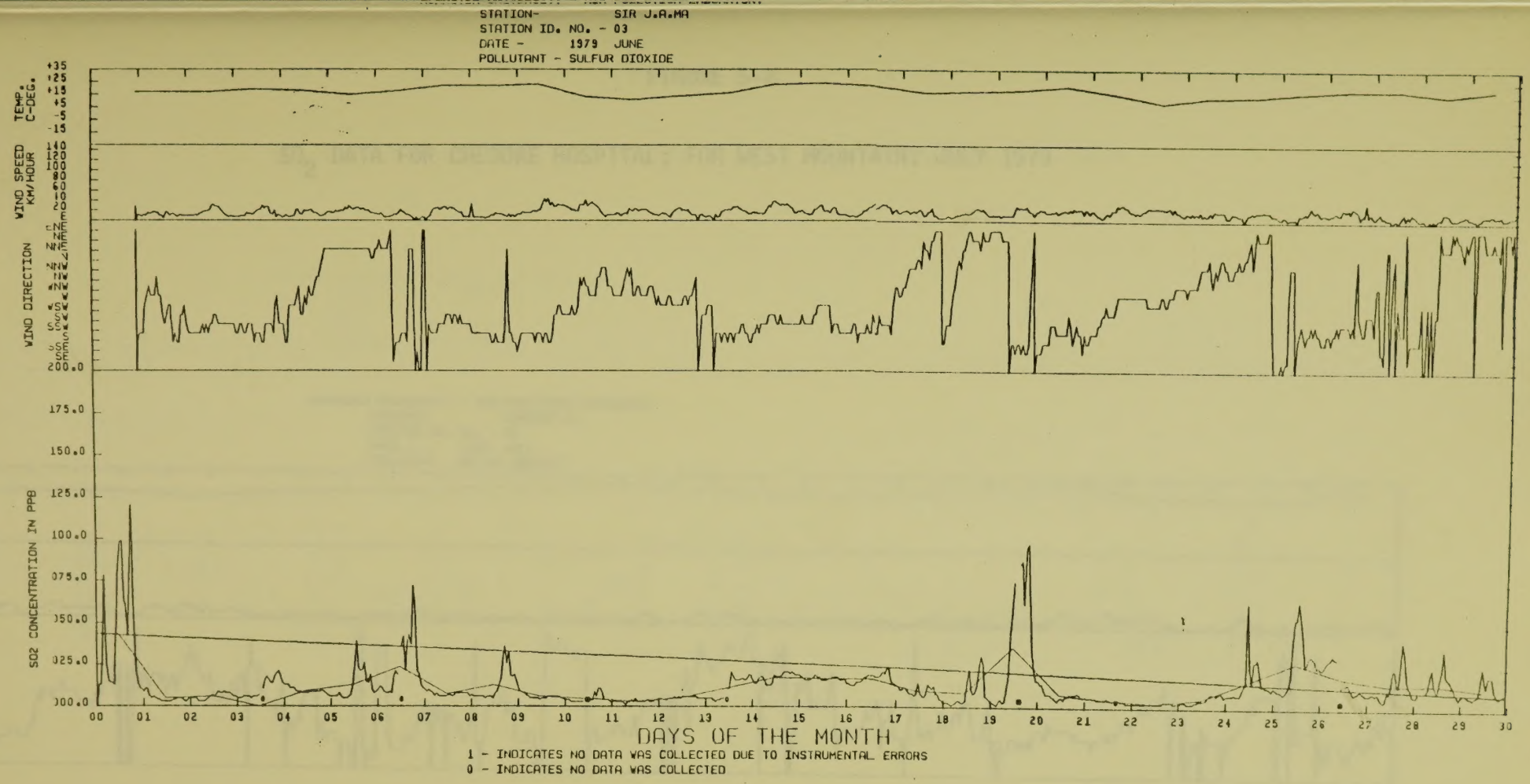

STATION- SIR J.A.MA
STATION ID. NO. - 03
DATE - 1979 JUNE
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

FIGURE 5-7

SO_2 DATA FOR SIR JOHN A. MACDONALD SECONDARY SCHOOL; DOWNTOWN LOWER CITY; JUNE 1979

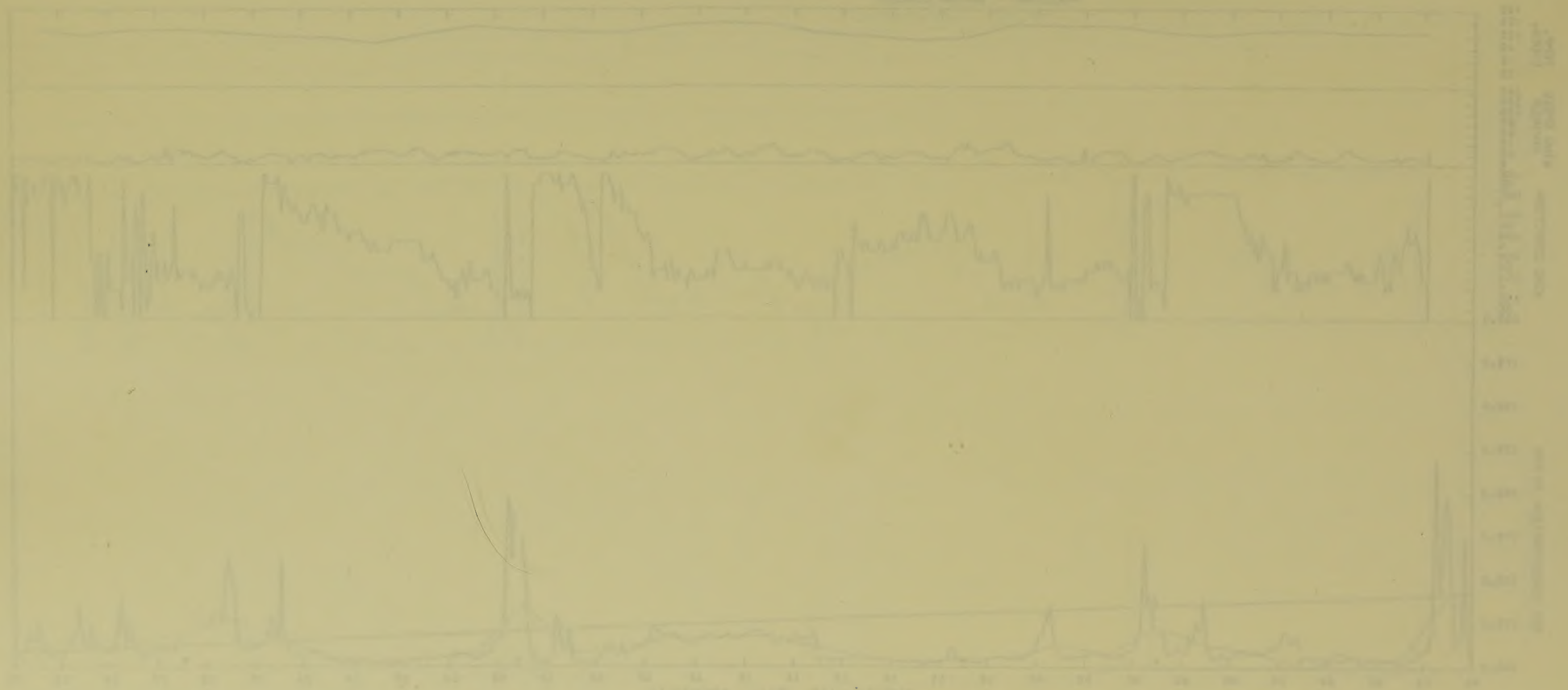


FIGURE 5-8

SO_2 DATA FOR CHEDOKE HOSPITAL; FOR WEST MOUNTAIN; JULY 1979

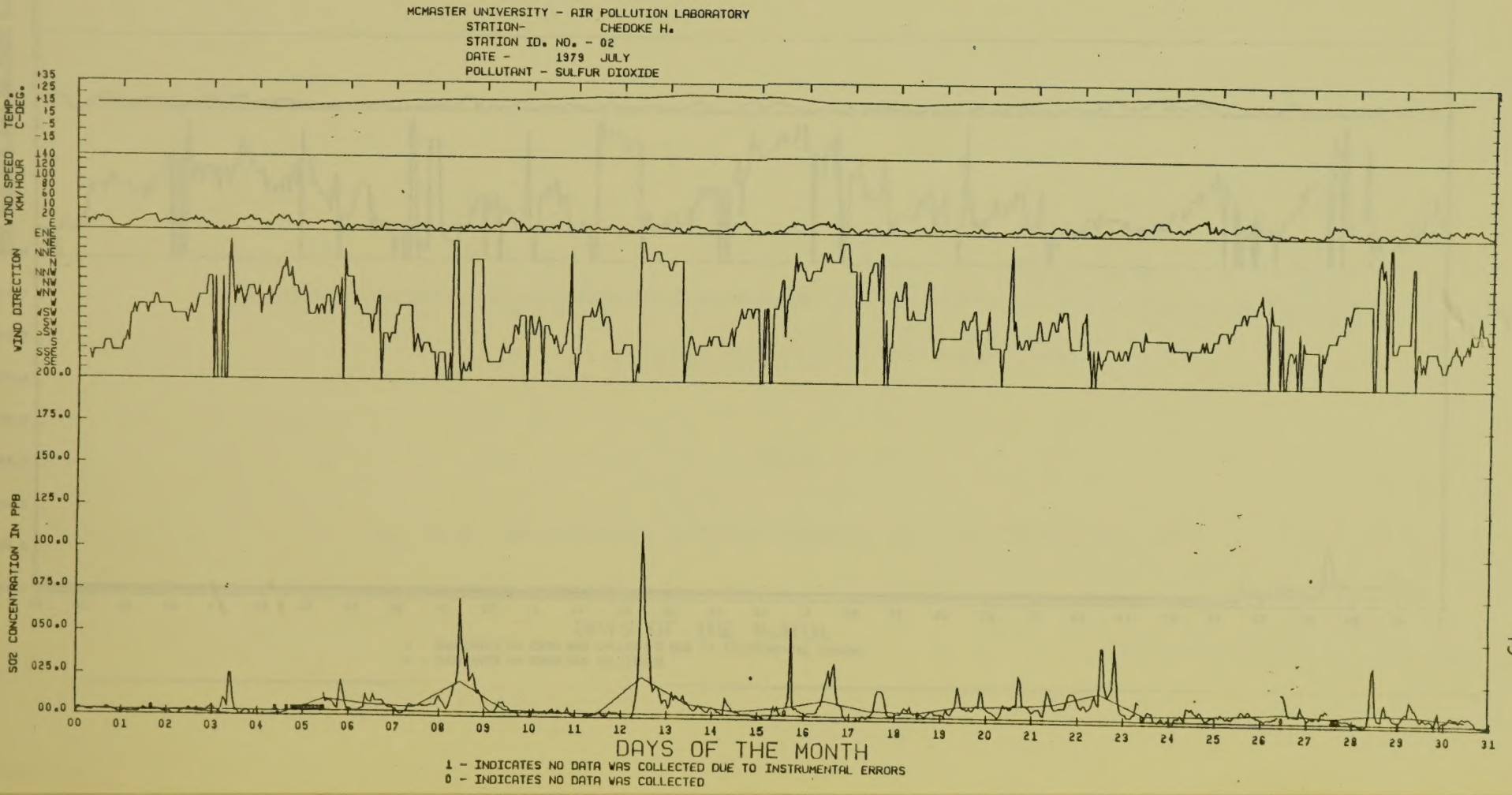
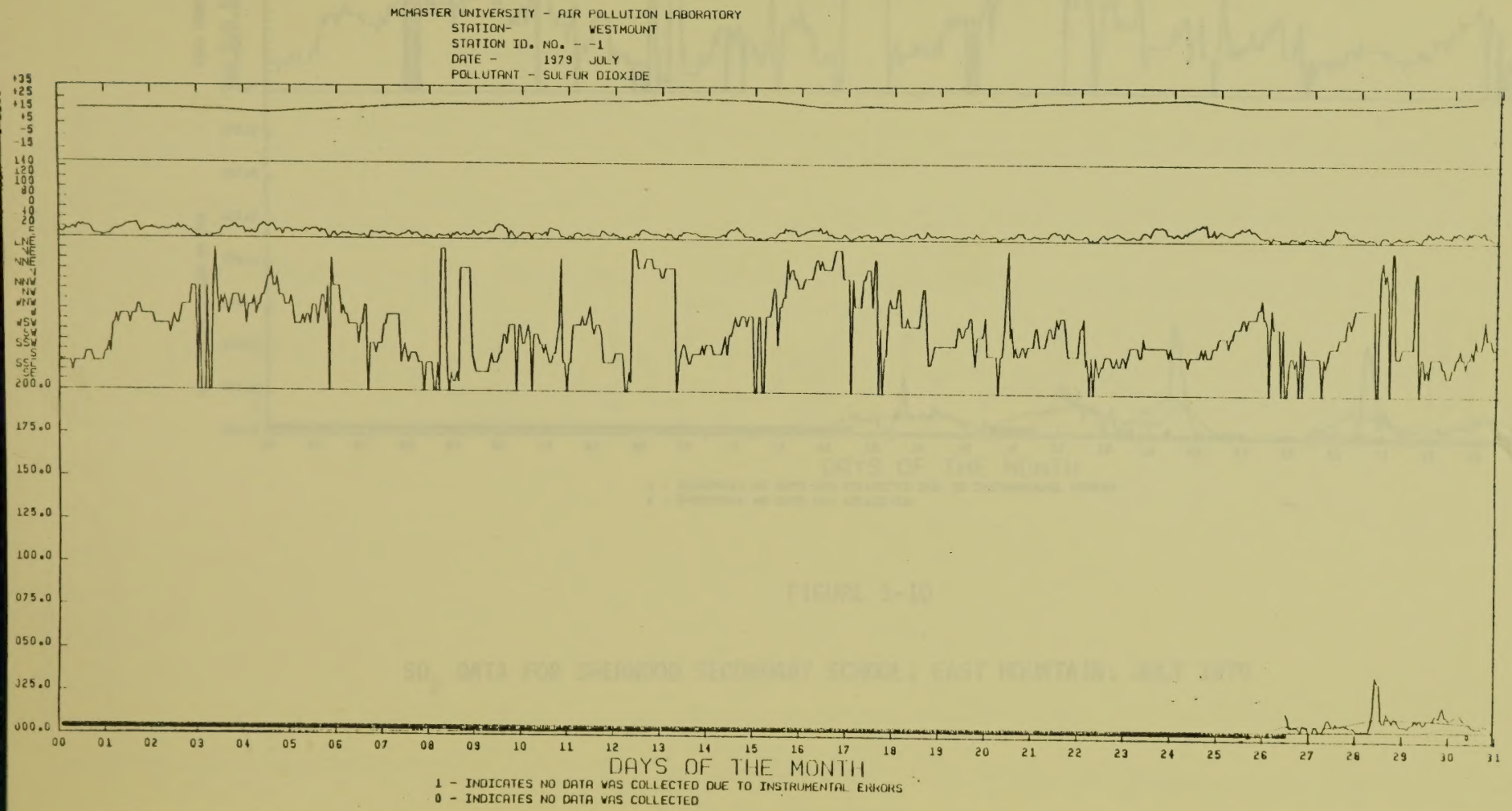

MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- CHEDOKE H.
STATION ID. NO. - 02
DATE - 1979 JULY
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

FIGURE 5-9

SO_2 DATA FOR WESTMOUNT SECONDARY SCHOOL; WEST MOUNTAIN; JULY 1979


MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- WESTMOUNT
STATION ID. NO. - -1
DATE - 1979 JULY
POLLUTANT - SULFUR DIOXIDE
200.0
175.0
150.0
125.0
100.0
075.0
050.0
025.0
000.0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

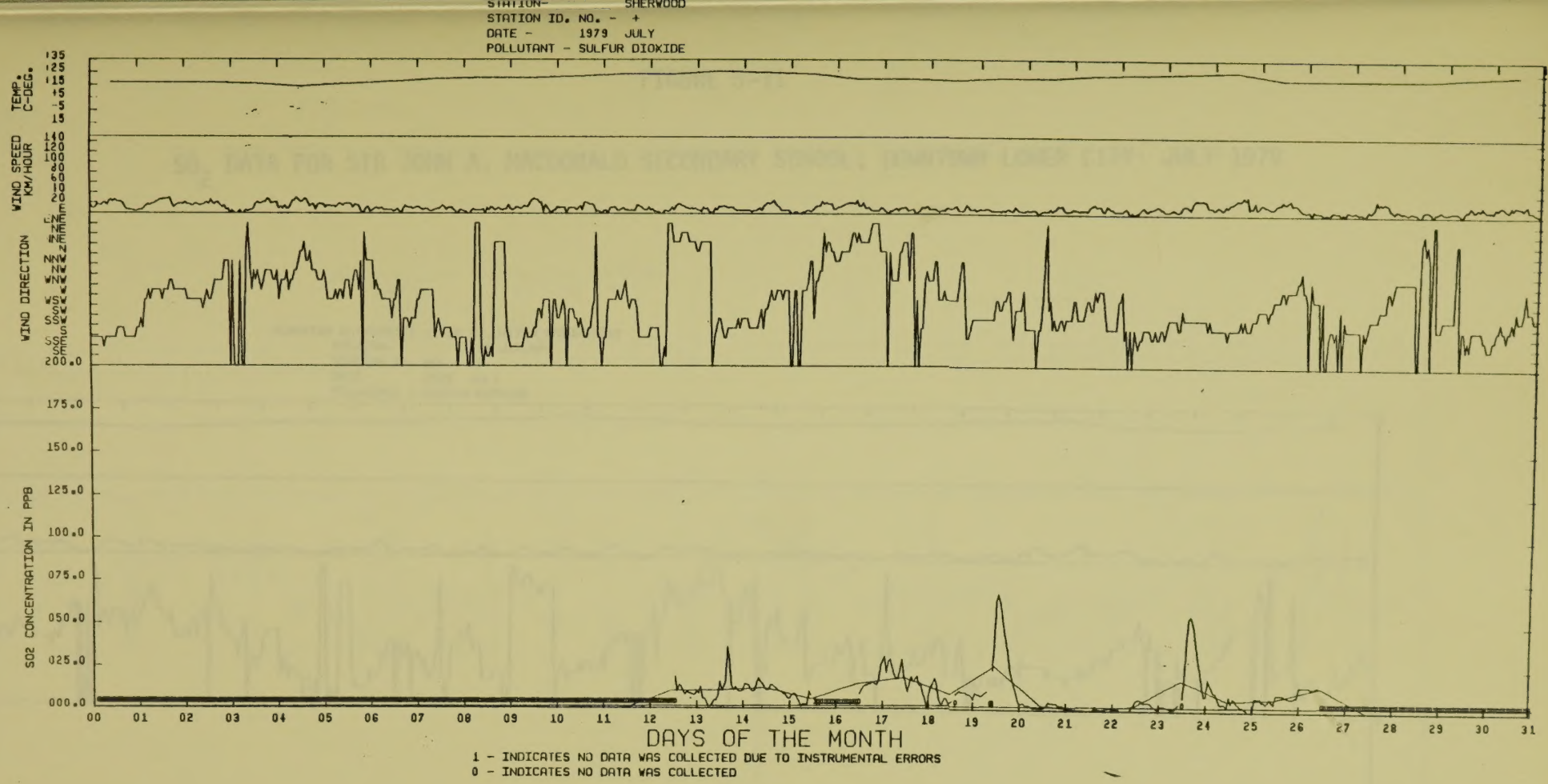

STATION- SHERWOOD
STATION ID. NO. - +
DATE - 1979 JULY
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

FIGURE 5-10

SO_2 DATA FOR SHERWOOD SECONDARY SCHOOL; EAST MOUNTAIN; JULY 1979

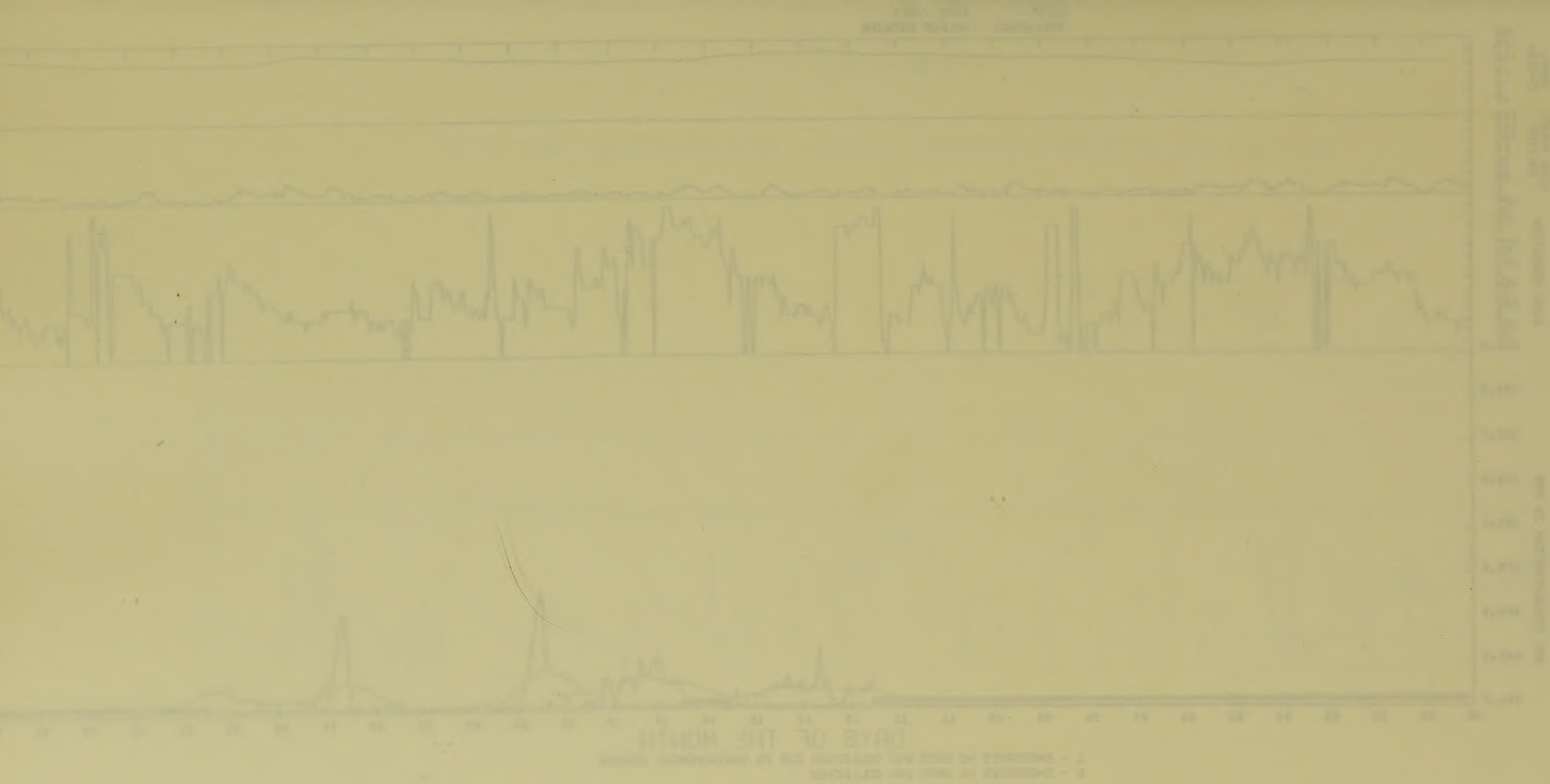
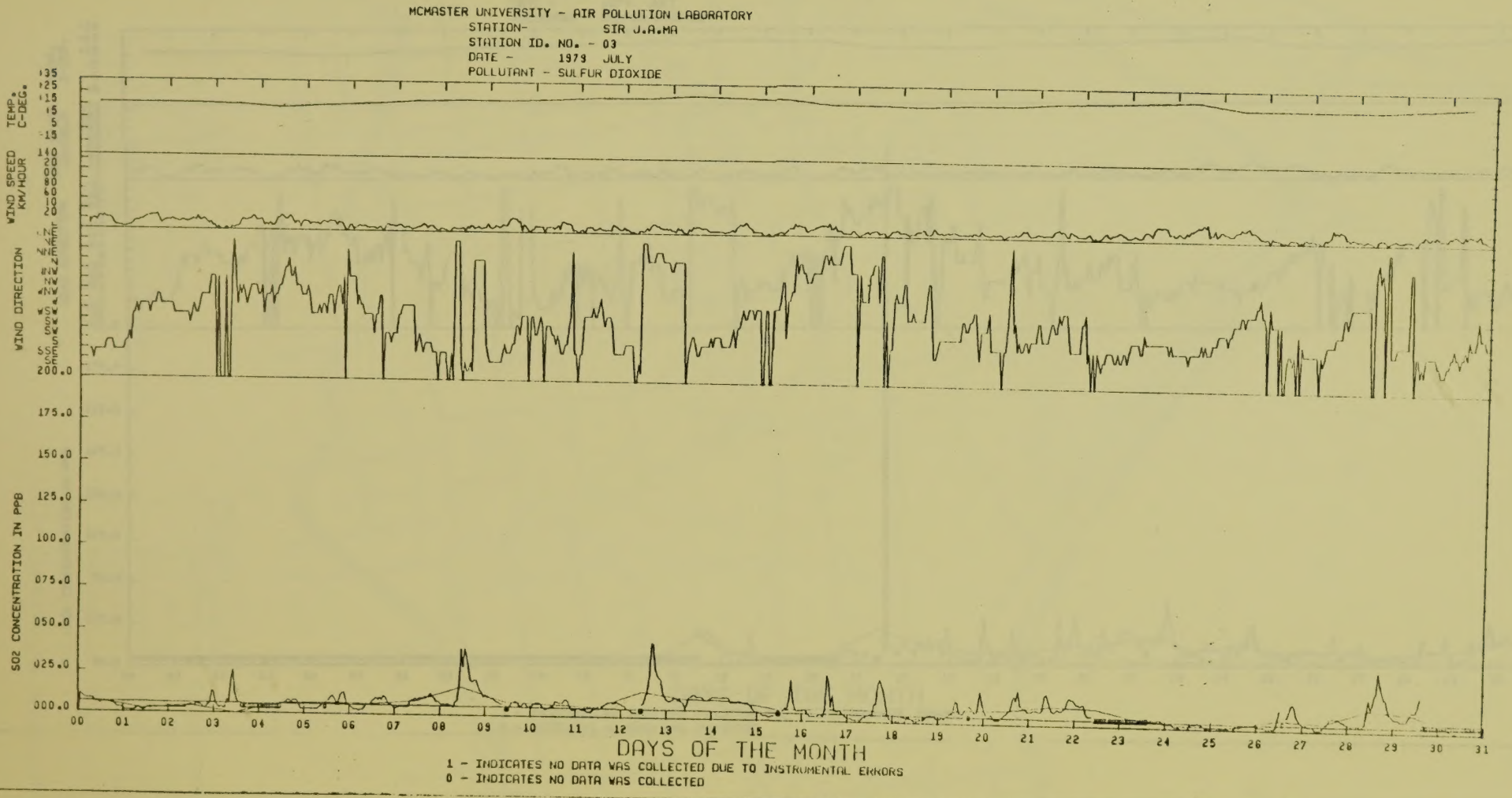


FIGURE 5-11

SO_2 DATA FOR SIR JOHN A. MACDONALD SECONDARY SCHOOL; DOWNTOWN LOWER CITY: JULY 1979


MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- SIR J.A.MA
STATION ID. NO. - 03
DATE - 1979 JULY
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
200.0
175.0
150.0
125.0
100.0
075.0
050.0
025.0
000.0
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

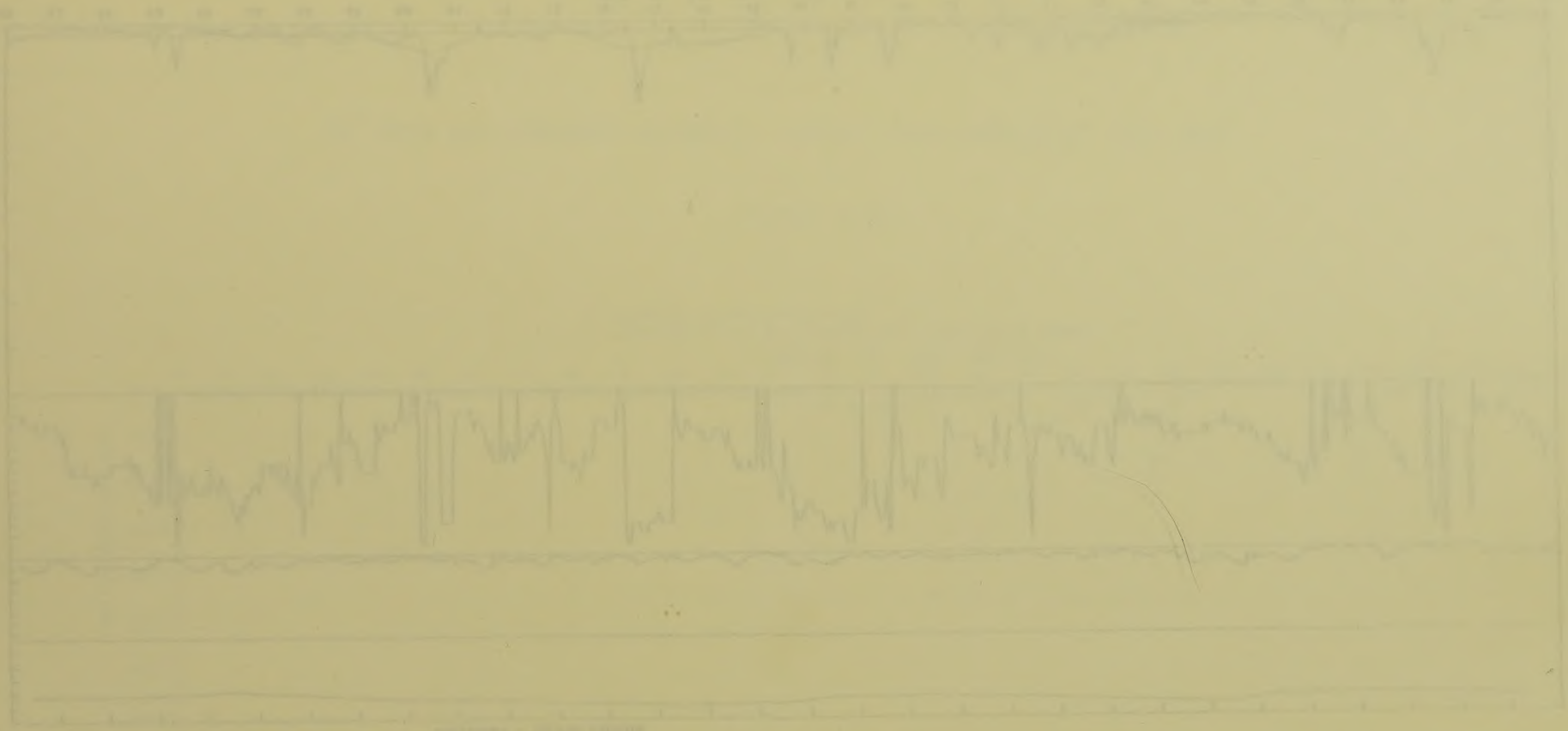
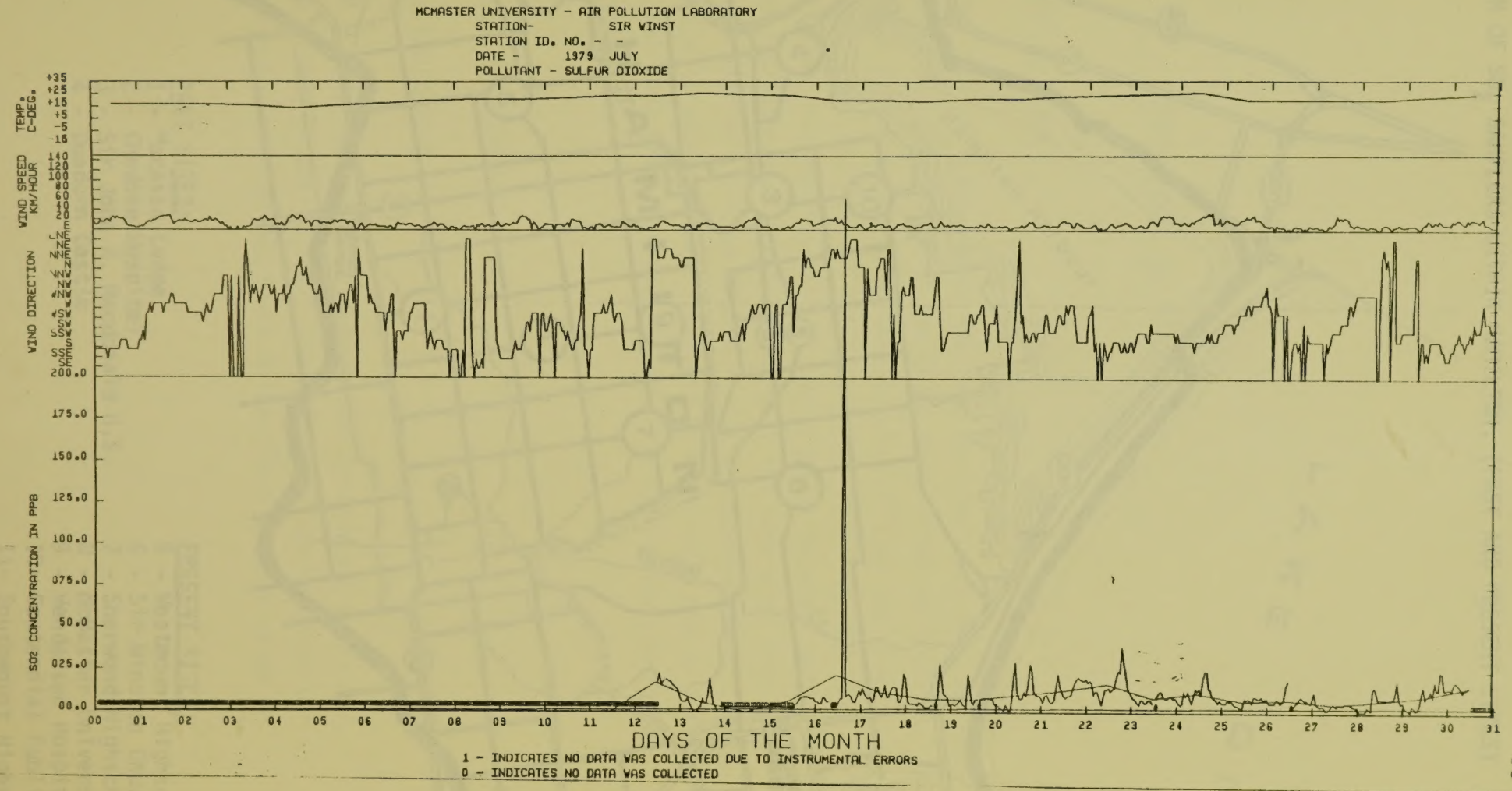


FIGURE 5-12

SO_2 DATA FOR SIR WINSTON CHURCHILL SECONDARY SCHOOL; EAST LOWER CITY; JULY 1979


MCMASTER UNIVERSITY - AIR POLLUTION LABORATORY
STATION- SIR WINST
STATION ID. NO. - -
DATE - 1979 JULY
POLLUTANT - SULFUR DIOXIDE
TEMP. C-DEG.
WIND SPEED KM/HOUR
WIND DIRECTION
SO2 CONCENTRATION IN PPB
DAYS OF THE MONTH
1 - INDICATES NO DATA WAS COLLECTED DUE TO INSTRUMENTAL ERRORS
0 - INDICATES NO DATA WAS COLLECTED

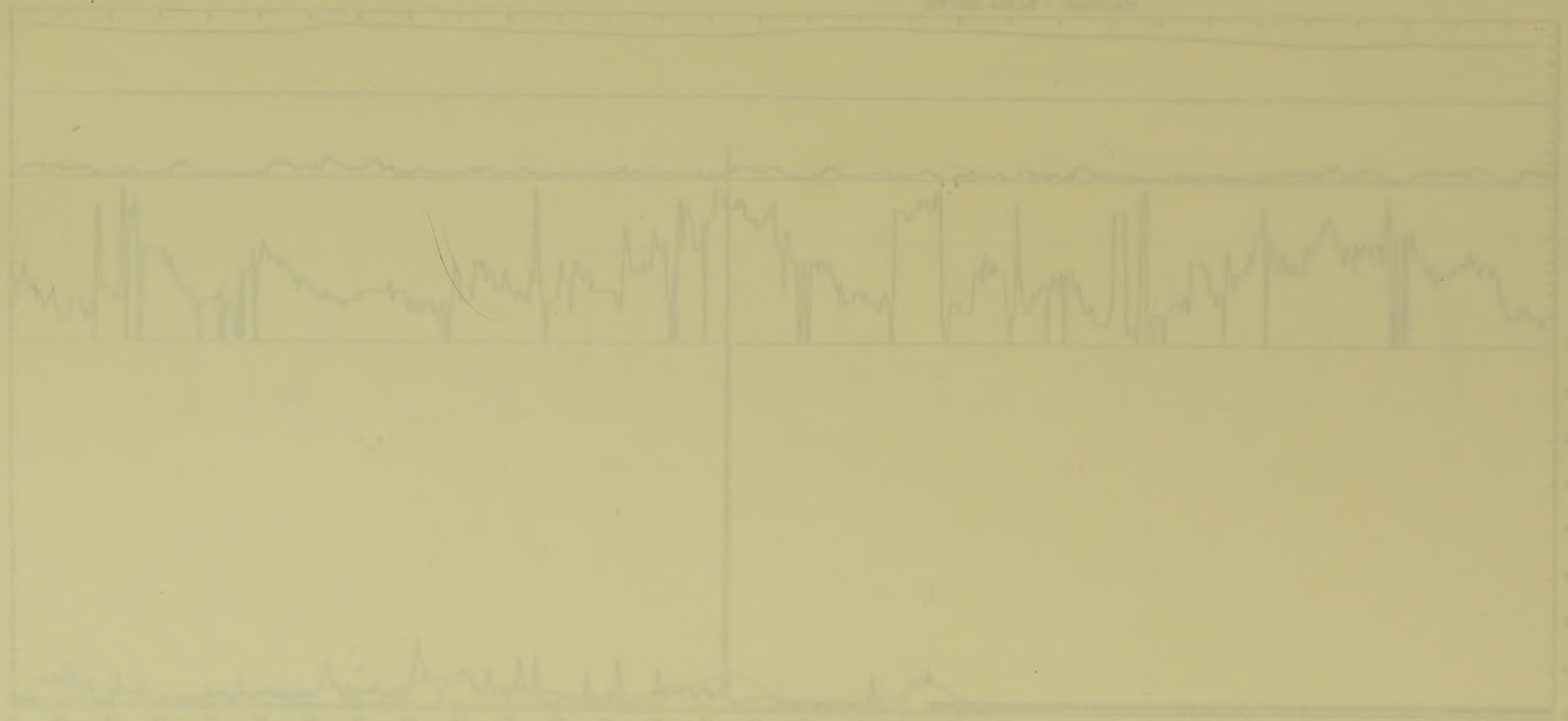


FIGURE 5-13

LOCATION OF SO_2 SAMPLERS WITHIN HAMILTON, (PAST AND PRESENT SITES)

PAST SITES:
1 - Macassa Lodge
2 - Chedoke Hospital
3 - Sir John A. Macdonald H.S.
4 - Dundurn Castle

PRESENT SITES:
5 - Westmount Highschool
6 - Sir Winston Churchill
7 - Sherwood Highschool
8 - McMaster University
9 - Henderson Hospital
10- Centennial Public School
11- Southmount Highschool

PART 6

CONCLUSIONS AND PROJECTIONS

6.1 EPIDEMIOLOGICAL SURVEY

Although the rate of interviewing has been mentioned and will present no obstacle to the completion of the three year survey on schedule, it will be the pulmonary function testing that will be the rate limiting step. The estimate of 2,600 children tested by June 1979 was not achieved, but testing will be completed by December 1979. However, we feel that Year 2 and Year 3 will not take more than one calendar year each and that we should finish by December 1981. Since we were unable to start originally before November 1978 due to funding delay, we feel that this schedule is certainly within the intentions of our protocol.

6.2 ENVIRONMENTAL MONITORING

6.2.1 PARTICULATE MONITORING

At the end of 1979, we intend to evalute our particulate sampling system with a view to making final adjustments in sampler location. Our indoor sampler will be developed to the field testing stage by

December 1979 as well.

6.2.2 SO_2 MONITORING

We have established a well organized network of monitoring stations around Hamilton. The sites have been chosen so as to obtain an overall view of existing pollution levels. Data output from this system is being processed by an off-line CDC 6400 computer.

At present, the LAS is being used to calibrate Beckmans brought in from the field. A field trial of the LAS in October will bring us closer to phasing out the Beckmans with the accurate and versatile LAS.

APPENDIX 3-1

PROTOCOL AND CRITERIA TO BE USED BY THE PULMONARY FUNCTION TESTERS IN THE SCHOOLS

September 1979

PROTOCOL

1. Each child is instructed before each test as to what is required.

2. The order of the tests is as follows. NWm x 1, FVC x 3, Spirometry x 1 and NWs x 2.

3. The tester ensures that the child is relaxed, that lips are sealed, and the noseclip is on properly.

4. NWm - This test is done with the child seated. Tidal breathing must be quiet, relaxed and regular when on the mouthpiece. When the child is ready the computer is switched in. The N2 must be falling; if not, the test will be invalid. The child continues to breathe quietly until less than 1% N2 is detected. The machine will stop automatically at about 0.8%. If the initial N2 readout on the computer display is less than 68% the test is invalid and must be repeated after a rest.

5. FVC - The child stands, non-supported (not leaning). The child breathes in room air to TLC, inserts FVC pneumotach, with a clean sterile mouthpiece into the mouth, and gives a forced expiration as rapidly

as possible to RV followed by a forced rapid inspiration back to TLC. The expiration must last for at least one second for the machine to record results.

6. Spirometry - This is done with the FVC pneumotach and the child seated. The child breathes quietly into the mouthpiece until the tester is satisfied with the relaxed VT, and switches in the computer. After four quiet VT breaths a maximum inspiration to TLC and expiration to RV is made. Quiet breathing is continued for three breaths to reestablish a stable FRC which should return to the pre VC baseline.

7. NWs - This is done seated with the N2 boom pneumotach. The child breathes normally (VT) until the machine signals ready then breathes out to RV. During expiration the O2 is switched on by the tester. At RV the child then inspires at a flow of 0.3 - 0.5 l/sec. to TLC and then expires at a similar flow rate to RV.

8. A short report is asked for all children. If parents have asked for results or if the child has low results (see criteria) a long report to the end of the FVC plot is asked for.

CRITERIA

GENERAL

Great care must be taken to ensure a good seal at the mouthpiece also that the child is relaxed and makes a maximum effort.

SPECIFICS

Nwm

Normal tidal breathing is essential. Test must be repeated if the initial N2 is less than 68% and if the final N2 is greater than 1%.

FVC

The two best VC's must be within 5% of each other. However, if the tester has done up to six attemps, with only one good VC resulting (the others are not within 5%), then the one good VC is still acceptable. If FVC/FEV1 ratio is less than 75%, then the three flow rates and also the MET sec are examined . Normal for the MET sec. is considered to be from .4 to .7. If the flow rates and the FVC/FEV1 are low, and the MET sec. is above .7 a long report is needed.

Spirometry

This VC is compared to the best FVC; if less than 10% the Spirometry is repeated, if more than 10%, the FVC is repeated. If ERV is less than 20% and more than 50% of VC, then the test must be repeated. FRC must be stable.

NWs

VC must be within 10% of largest previous VC. If VC greater than 10% of previous values repeat FVC and Spirometry. Two acceptable

manoeuvres should be obtained and up to five attempts made to obtain these. Nws Spirometry should liik okay; FRC must be stable and an obvious ERV and IC manoeuvre present (scale is too small to measure). Expired and inspired VC's (check NWs Spirometry) should be approximately the same.

COMMENTS

Children with colds or hayfever must have this data entered under "comments". Heavy bronchial lower chest colds are entered as "lower respiratory heavy", sneezing, dry coughing and upper chest colds are entered as "upper respiratory heavy", and sniffles as "slight cold".

Any medical information concerning the child and known to the tester e.g. asthma, should be entered also.

APPENDIX 3-2

PROTOCOL AND CRITERIA TO BE USED BY THE CODERS OF PULMONARY FUNCTION DATA

September 1979

PROTOCOL

1. The two Assistant Technicians code the Patient information and the results of the NWm, FVC and Spirometry tests. This is done in the schools immediately after each child is tested.

2. The Supervisor of Pulmonary Function Studies codes the results of the NWs tests for both teams. This is done at McMaster in the week following testing.

3. When all coders have completed 20 tests, a randomized quality control is done.

CRITERIA

1. PATIENT DATA

   Information on the Report must agree with the information slip for each child.

2. NWm

The initial N2 concentration must not be less than 65% and must fall continuously to not more than 1%.

3. FVC

This must be within 10% of the biggest VC obtained on any test.

4. SPIROMETRY

VC must be within 10% of biggest. FRC must be stable, ie the baseline must not deviate by more than 200 ml (by eye). FRC after VC manoeuvre should be approximately the same as before the manoeuvre. If the machine has chosen an incorrect FRC, the coders will correct this, recalculate the ERV and IC and adjust the RV and TLC values accordingly.

5. NWs

The VC must be within 10% of the biggest. Spirometry must look acceptable ie a stable FRC and visible ERV/IC/ERV manoeuvre. If the machine has picked the wrong slope for Phase III, the wrong beginning of Phase IV or has incorrectly calculated the N2 difference, these will be remeasured and corrected by the coders. Where the test has a "sloping baseline" the IC value is wrong which invalidates the calculated FRC. This is therefore, coded as 999. If two NWs tests are acceptable by all previous criteria, with VCs within 50% of each other with either both or neither having sloping baselines, all values are entered as the mean of the two tests.

APPENDIX 5-1

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION CHEDOKE LOCATION WEST MNT. RICE AND MOHAWK DATE: 1979 FEB

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0
2	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	---	0
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	010	015	018	023	020	018	015	014	013	012	014	15
9	012	012	011	010	010	010	010	010	010	010	010	010	010	010	010	010	010	010	010	010	010	010	010	012	10
10	012	012	012	013	014	014	015	014	012	010	010	010	010	010	010	010	010	010	010	010	010	012	017	016	11
11	014	015	013	014	012	012	017	022	023	027	024	023	030	030	021	017	015	016	017	017	013	012	012	012	17
12	012	012	015	025	025	020	020	020	030	030	030	---	053	053	037	035	060	057	036	025	012	012	005	000	27
13	000	000	002	001	003	001	003	007	012	016	007	001	001	004	018	015	007	008	008	010	003	004	005	008	6
14	007	020	007	008	004	080	050	040	033	035	040	033	016	025	027	027	038	017	011	011	012	011	018	025	24
15	030	029	026	015	011	008	017	025	017	010	008	008	011	014	013	012	013	017	009	012	012	020	022	021	15
16	020	022	033	028	016	012	005	004	003	003	005	006	003	004	003	003	003	003	005	003	008	018	014	005	9
17	003	003	003	004	004	004	003	003	004	005	005	005	005	005	005	005	006	010	017	025	020	013	017	010	7
18	008	042	042	050	030	034	038	036	035	016	014	010	015	011	009	008	006	003	001	003	007	008	013	020	19
19	028	024	028	028	025	032	***	***	***	***	***	***	***	***	***	015	016	018	020	020	030	044	037	040	27
20	046	040	033	037	035	035	036	045	051	060	068	076	074	079	075	067	063	065	064	064	067	076	080	090	59
21	105	112	118	122	120	121	108	095	107	083	020	010	010	008	008	008	008	008	008	008	008	009	009	011	51
22	015	018	024	025	025	023	022	022	021	021	020	021	023	024	022	023	030	033	038	030	042	030	025	027	26
23	040	048	055	037	050	033	033	044	043	048	038	042	033	015	015	013	015	013	013	013	013	013	013	013	28
24	013	013	013	013	013	013	013	013	035	066	050	033	028	027	024	024	023	023	022	020	020	019	018	019	23
25	019	021	027	021	018	017	016	018	020	023	028	015	016	015	018	020	011	018	006	004	008	005	007	007	15
26	012	015	023	012	006	018	005	004	004	000	002	005	009	010	010	010	010	010	009	008	007	006	005	009	8
27	007	005	011	009	007	011	008	010	005	007	005	006	006	005	007	010	008	006	004	003	003	003	000	000	6
28	000	000	000	000	000	000	000	000	000	002	002	002	000	000	003	004	005	003	003	004	004	006	010	008	2
MEAN	18	21	22	21	19	22	19	20	22	22	18	15	16	16	15	15	16	16	14	14	14	14	15	16	17

PERCENTAGE OF DATA VALID -78.57 PERCENTAGE OF DATA INVALID - 1.34 PERCENTAGE OF DATA UNAVAILABLE -20.09

TABLE 5-1-1

SO_2 Data For Chedoke Site (West Mountain) - February 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION MACASSA LOCATION SHERMAN AND FENNEL DATE: 1979 FEB

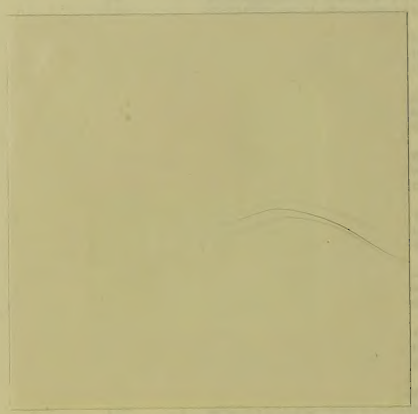
POLLUTANT-SULPHUR DIOXICE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
9	---	---	---	---	---	---	---	---	---	---	---	---	003	003	004	005	004	003	003	003	002	002	001	001	2
10	003	004	005	006	007	008	008	009	010	010	004	003	003	003	004	003	002	001	002	003	004	005	008	010	5
11	012	013	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	006	006	9
12	***	007	***	***	***	***	***	***	***	***	060	047	042	037	015	010	025	022	013	009	000	000	000	000	19
13	000	000	005	004	002	007	004	007	010	000	000	000	000	000	000	000	000	000	000	000	001	005	005	002	2
14	000	000	010	017	050	058	037	033	022	035	037	016	010	012	017	020	017	008	005	007	008	008	009	011	18
15	008	010	008	008	008	007	015	017	012	007	005	003	004	003	003	002	002	001	001	001	002	002	004	004	5
16	002	001	001	025	027	010	005	003	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	3
17	000	000	000	000	000	000	000	000	000	000	005	015	020	020	020	017	020	015	017	014	010	020	022	037	10
18	045	052	058	035	020	037	040	025	015	011	012	016	005	005	004	003	003	003	003	003	005	006	008	010	17
19	014	015	015	017	027	037	036	037	050	052	030	017	014	011	012	011	011	010	010	010	017	027	023	022	21
20	027	025	021	023	022	023	025	026	032	043	051	054	053	055	055	053	043	041	040	038	042	048	051	060	39
21	071	078	081	080	082	083	072	070	075	050	030	022	012	008	006	005	003	001	001	001	002	002	002	003	35
22	005	006	010	012	012	011	011	011	012	012	***	***	***	***	***	***	***	***	***	***	***	***	***	***	10
23	***	***	006	006	006	006	006	007	008	004	003	005	***	***	***	***	000	010	010	003	002	002	002	001	4
24	001	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0
25	001	002	006	005	004	003	003	003	003	003	000	000	000	000	000	000	000	000	000	000	000	000	000	001	1
26	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	001	002	002	0
27	000	001	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0
28	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0
MEAN	11	11	13	14	15	17	15	14	14	13	13	10	9	9	8	7	7	6	5	5	5	7	7	8	10

PERCENTAGE OF DATA VALID -62.50 PERCENTAGE OF DATA INVALID - 7.29 PERCENTAGE OF DATA UNAVAILABLE -30.21

TABLE 5-1-2

SO_2 Data For Macassa Site (Central Mountain) - February 1979



MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION CHEDOKE LOCATION WEST MNT. RICE AND MOHAWK DATE: 1979 MAR

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
DAY																									
1	018	015	015	019	020	014	011	010	009	008	008	008	007	009	009	009	008	007	008	005	005	005	005	005	9
2	005	004	004	004	004	004	004	004	004	004	004	---	002	005	005	006	006	008	012	024	037	035	020	020	9
3	018	021	025	028	034	021	021	028	035	035	028	025	040	053	063	060	030	028	093	098	018	013	010	008	34
4	008	005	003	002	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	005	003	1
5	002	001	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0
6	000	000	000	000	000	018	020	004	013	013	010	008	003	001	000	000	000	000	000	000	000	000	000	000	3
7	000	000	000	000	000	000	000	000	003	007	004	008	010	025	028	---	045	060	025	025	015	015	020	022	13
8	015	023	020	028	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	21
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
12	---	---	---	---	---	---	---	---	---	---	---	---	000	000	000	000	000	000	000	000	000	000	000	002	0
13	006	012	018	020	015	012	010	025	055	062	045	040	035	032	023	018	015	010	008	006	006	006	006	008	20
14	009	006	003	003	002	003	002	002	002	002	002	002	002	002	002	002	002	002	003	004	005	003	002	002	2
15	002	002	002	003	002	001	002	001	001	002	001	000	000	000	000	000	000	000	000	000	000	000	000	000	0
16	000	000	000	000	000	000	001	002	003	004	004	003	003	005	005	005	012	011	010	008	008	008	006	006	4
17	005	006	006	007	007	008	008	008	010	011	012	012	011	009	009	012	038	095	068	053	038	024	023	033	21
18	035	035	025	018	013	010	010	009	009	012	015	020	033	040	028	015	011	010	009	007	007	008	008	008	16
19	008	008	006	006	005	004	004	007	007	011	011	011	009	010	011	013	018	021	020	015	011	014	010	008	10
20	010	011	013	013	013	014	011	011	011	012	011	015	020	028	025	021	020	016	014	010	008	008	008	006	13
21	003	005	008	008	008	005	005	010	010	013	025	028	028	030	026	021	019	019	015	013	016	025	025	038	16
22	035	025	018	018	016	018	016	014	016	023	026	021	023	021	020	028	023	038	040	035	023	062	040	028	26
23	025	028	031	018	010	008	003	007	015	034	044	030	033	038	018	018	014	030	032	016	005	004	003	000	19
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	002	002	002	002	002	002	003	002	002	002	2
26	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	001	001	003	003	002	0
27	002	001	002	002	002	002	002	002	002	002	003	003	003	003	003	003	003	003	003	002	001	002	002	002	2
28	003	003	002	000	000	000	003	005	008	010	006	033	034	004	003	023	023	030	033	020	009	010	010	005	11
29	003	002	001	000	000	000	000	003	003	003	003	003	003	003	003	002	010	015	013	008	007	005	005	005	4
30	005	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	5
31	***	***	010	009	009	009	009	010	010	010	010	010	010	020	038	028	022	020	017	017	015	015	014	013	14
MEAN	9	9	8	8	6	6	6	7	9	12	11	12	12	13	12	11	12	17	16	14	9	10	9	9	10

PERCENTAGE OF DATA VALID -77.55 PERCENTAGE OF DATA INVALID - 3.36 PERCENTAGE OF DATA UNAVAILABLE -19.09

TABLE 5-1-3

SO_2 Data For Chedoke Site (West Mountain) - March 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION MACASSA LOCATION SHERMAN AND FENNEL DATE: 1979 MAR

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	3
2	003	003	003	003	003	003	003	003	003	003	003	003	003	004	003	003	003	001	000	002	006	008	003	003	3
3	002	003	005	005	005	008	010	011	009	007	006	005	005	005	005	005	004	004	010	010	006	004	003	002	5
4	001	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0
5	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	005	000	000	000	000	000	0
6	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	0
7	000	000	000	000	000	000	000	000	000	000	000	000	000	003	001	000	000	003	003	003	003	003	003	003	1
8	002	000	003	005	007	013	013	013	010	010	006	004	003	005	004	004	000	003	002	000	004	005	007	***	5
9	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
10	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
11	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
12	***	***	***	***	***	***	***	***	***	***	***	***	000	000	000	000	000	000	000	000	000	000	000	000	0
13	000	000	000	000	000	000	000	000	005	018	028	030	024	021	015	012	010	---	---	---	006	006	006	006	8
14	006	006	006	007	007	008	008	008	008	007	007	007	007	007	006	007	006	005	005	004	004	004	003	003	6
15	003	003	003	002	002	002	002	002	001	001	001	001	001	001	001	000	000	000	000	000	000	000	000	000	1
16	000	000	002	002	001	001	001	001	004	005	008	008	008	008	010	010	009	006	006	006	006	006	005	004	4
17	003	003	003	003	002	003	005	006	009	010	010	009	008	006	005	005	029	039	022	022	025	020	016	029	12
18	013	017	025	021	021	023	024	027	027	027	038	070	031	044	023	020	015	010	010	010	010	010	010	024	22
19	014	018	015	007	008	008	008	004	001	002	002	003	004	006	010	007	006	006	010	010	013	010	011	028	8
20	023	022	022	024	030	026	023	038	033	015	015	015	017	015	013	012	015	018	019	026	021	025	024	025	21
21	020	025	025	035	058	100	055	028	019	015	013	012	013	013	031	031	028	024	***	***	***	***	***	***	30
22	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	008	015	020	024	024	031	030	039	044	26
23	022	020	017	013	014	013	016	019	019	018	029	024	033	015	013	015	013	020	033	010	010	010	010	010	17
24	010	010	010	013	020	020	009	009	010	010	009	006	005	005	015	013	006	005	005	004	004	003	003	002	8
25	002	001	000	000	000	000	000	000	000	000	000	000	000	000	000	000	002	003	003	003	003	003	003	004	1
26	003	004	003	003	003	002	001	001	002	002	001	001	001	001	001	001	001	000	001	002	002	003	003	003	1
27	003	004	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	3
28	003	003	002	001	001	001	003	003	003	003	003	015	013	004	003	006	004	003	003	002	003	003	006	006	4
29	022	026	020	005	005	005	005	005	004	004	004	004	004	004	004	004	002	003	006	009	010	005	003	003	6
30	004	004	005	013	013	015	020	015	008	007	006	005	005	005	005	004	003	004	005	007	008	008	009	010	7
31	006	005	005	005	005	004	004	004	004	005	005	005	005	006	005	005	005	005	005	004	003	003	003	003	4
MEAN	6	6	6	6	8	10	8	7	7	6	7	8	7	6	6	6	6	7	6	6	6	6	6	8	6

PERCENTAGE OF DATA VALID -85.35 PERCENTAGE OF DATA INVALID -14.25 PERCENTAGE OF DATA UNAVAILABLE - .40

TABLE 5-1-4

SO_2 Data For Macassa Site (Central Mountain) - March 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SIR J.A.M AC. LOCATION CANON AND BAY DATE: 1979 MAR

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	006	008	010	009	008	007	010	009	8
17	010	009	009	011	014	011	013	015	011	013	012	013	011	009	011	016	030	030	020	017	012	012	018	019	14
18	018	018	016	013	013	013	012	014	025	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	015	011	009	009	009	011	011	014	11
20	016	015	013	016	018	016	021	015	014	018	014	017	020	016	011	013	011	016	016	019	016	013	014	012	15
21	012	012	018	011	012	009	015	019	013	013	019	019	023	014	018	016	013	***	***	***	***	***	012	016	14
22	016	018	020	017	021	019	016	008	009	025	016	009	---	---	---	---	---	---	---	---	---	---	---	---	16
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	001	003	003	003	005	004	003	3
28	005	007	007	008	007	009	012	019	---	013	012	017	028	012	014	026	021	014	014	018	018	010	009	009	13
29	014	008	006	006	006	007	008	009	008	008	006	005	005	005	---	003	007	008	013	018	016	009	012	009	8
30	008	005	003	003	006	006	010	011	013	012	014	013	009	010	008	004	004	004	004	005	006	008	007	005	7
31	005	005	004	003	003	003	003	003	001	000	000	000	003	003	002	001	001	004	001	000	000	000	***	***	2
MEAN	11	10	10	9	11	10	12	12	10	12	11	11	14	9	10	11	12	10	10	10	9	8	10	10	10

PERCENTAGE OF DATA VALID -27.28 PERCENTAGE OF DATA INVALID - .94 PERCENTAGE OF DATA UNAVAILABLE -71.77

TABLE 5-1-5

SO_2 Data for Sir John A. MacDonald Site (Downtown Lower City) - March 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION CHEDOKE LOCATION WEST MNT. RICE AND MOHAWK DATE: 1979 APR

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
DAY																									
1	010	010	010	008	009	006	006	011	008	013	011	008	008	012	015	016	018	018	013	009	013	016	015	018	11
2	011	006	003	003	001	002	001	001	001	004	005	---	006	010	011	011	013	013	013	012	013	013	013	011	7
3	024	028	018	014	013	011	011	010	011	011	012	007	006	007	007	009	013	011	006	005	006	008	006	006	10
4	006	007	009	018	014	011	014	010	011	011	---	008	009	011	011	010	008	008	009	007	007	009	008	005	9
5	004	005	004	003	003	003	003	003	002	001	002	001	002	003	003	003	003	005	003	006	006	007	004	003	3
6	003	002	002	003	002	002	002	001	001	001	001	001	000	001	---	---	006	010	012	013	014	016	016	016	5
7	016	016	016	017	018	016	018	018	017	018	018	016	016	016	016	016	015	015	014	015	013	013	013	013	15
8	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
9	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
10	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
11	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
12	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
13	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
14	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
15	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
16	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
17	***	***	***	***	***	***	***	***	***	002	003	003	004	003	003	003	003	003	003	003	003	003	004	006	3
18	005	005	005	008	006	006	006	006	006	005	005	005	005	005	005	006	006	005	006	006	005	006	008	005	5
19	008	007	007	008	008	009	008	009	010	009	---	003	003	004	004	010	006	008	015	011	006	008	006	006	7
20	008	008	024	036	021	022	015	020	032	049	056	051	054	058	051	051	034	038	025	033	027	016	012	011	31
21	011	010	013	013	014	016	019	019	024	020	015	035	054	055	051	053	043	040	037	023	021	053	050	021	29
22	018	019	015	013	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	16
23	***	***	***	***	***	***	***	***	***	***	***	005	009	009	009	010	010	010	010	011	016	060	048	061	20
24	036	027	030	025	024	027	027	039	039	048	074	079	091	068	066	066	063	051	056	050	046	048	035	035	47
25	060	036	031	025	044	051	048	054	049	052	049	046	036	046	053	056	038	035	036	035	033	025	013	011	40
26	013	013	019	014	015	009	009	015	013	011	009	009	009	---	009	006	005	005	005	005	005	004	005	006	9
27	005	003	003	000	000	000	001	000	000	001	000	000	000	000	000	000	000	000	000	000	000	000	000	001	0
28	000	001	001	000	002	003	005	011	015	014	019	016	011	013	012	023	028	025	028	024	010	005	003	002	11
29	002	002	001	003	003	003	004	004	005	006	005	005	005	004	005	005	005	006	006	005	006	006	006	006	4
30	008	013	014	017	021	018	010	008	007	008	---	004	011	008	003	004	007	005	005	008	008	008	009	010	9
MEAN	13	11	11	12	12	11	11	13	13	14	17	15	16	17	17	18	16	15	15	13	12	16	13	12	13

PERCENTAGE OF DATA VALID -63.47 PERCENTAGE OF DATA INVALID -35.56 PERCENTAGE OF DATA UNAVAILABLE - .97

TABLE 5-1-6

SO_2 Data for Chedoke Site (West Mountain) - April 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION MACASSA LOCATION SHERMAN AND FENNEL DATE: 1979 APR

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
17	---	---	---	---	---	---	---	---	---	---	---	---	003	005	006	006	006	006	006	006	006	005	005	005	004	5
18	004	005	005	006	006	006	005	004	004	004	020	011	007	004	006	006	004	004	003	002	001	001	000	000	4
19	000	000	001	001	001	001	000	009	019	010	038	011	009	010	013	014	014	013	006	004	003	002	001	002	7
20	009	021	017	018	011	010	011	035	033	043	048	026	024	---	010	009	010	011	006	021	021	009	004	003	17
21	003	003	002	003	012	014	009	012	026	014	018	018	014	017	014	013	011	004	008	040	044	025	040	017	15
22	007	008	006	006	004	004	004	004	003	008	011	013	011	009	008	006	005	006	006	004	002	000	000	001	5
23	001	000	000	000	***	***	***	***	***	000	000	001	---	002	008	010	010	009	009	008	008	008	011	008	5
24	013	013	010	008	003	008	013	013	025	025	021	011	020	020	015	015	015	015	020	021	023	020	028	028	16
25	018	019	040	023	018	035	038	021	015	028	028	020	019	025	033	040	020	018	015	010	010	008	008	008	21
26	008	008	008	008	010	010	010	009	008	008	008	008	008	---	010	010	009	009	009	010	010	009	010	010	9
27	010	010	010	009	009	008	006	006	005	005	005	005	005	005	005	005	005	004	004	004	004	004	003	003	5
28	003	003	003	002	002	002	003	003	003	000	000	000	000	000	000	000	002	005	005	014	008	005	005	003	2
29	003	003	003	003	004	004	004	004	004	004	005	005	006	006	006	006	005	005	005	008	004	004	004	003	4
30	008	013	019	018	008	008	005	004	004	005	005	---	---	016	009	007	007	008	008	008	008	006	006	006	8
MEAN	6	8	9	8	7	9	9	10	12	11	15	10	10	10	10	10	8	8	7	11	11	7	8	57	11

PERCENTAGE OF DATA VALID -43.83 PERCENTAGE OF DATA INVALID - .69 PERCENTAGE OF DATA UNAVAILABLE -55.48

TABLE 5-1-7

SO_2 Data For Macassa Site (Central Mountain) - April 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SIR J.A.M AC. LOCATION CANON AND BAY DATE: 1979 APR

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
3	003	001	001	001	001	001	002	003	002	001	001	001	000	001	000	003	004	003	003	003	004	004	003	001	1
4	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	004	006	006	009	004	006	006	003	---	7
5	002	001	001	001	000	000	000	001	001	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
MEAN	2	2	3	5	3	3	4	4	6	2	2	2	2	2	5	4	3	3	4	4	4	4	4	2	3

PERCENTAGE OF DATA VALID -12.92 PERCENTAGE OF DATA INVALID - 0.00 PERCENTAGE OF DATA UNAVAILABLE -87.08

TABLE 5-1-8

SO_2 Data For Sir John A. MacDonald Site (Downtown Lower City) - April 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION CHEDOKE LOCATION WEST MNT. RICE AND MOHAWK DATE: 1979 MAY

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	008	008	006	006	007	008	008	010	011	012	011	010	008	009	009	009	009	009	010	008	008	008	008	007	8
2	006	005	005	006	005	010	013	025	038	046	044	028	036	049	026	033	038	035	018	019	029	027	029		25
3	011	024	011	005	004	006	016	021	019	014	---	---	028	030	018	011	004	004	004	003	003	003	003		11
4	002	001	001	001	001	001	001	002	003	010	001	000	000	001	003	002	003	005	004	005	005	005	004	004	2
5	004	004	003	003	003	002	003	003	004	004	004	004	004	003	003	003	003	003	003	003	003	003	004	003	3
6	003	002	003	004	004	007	023	026	021	029	026	028	029	024	036	026	033	038	020	019	010	006	006	006	17
7	007	006	008	006	004	004	005	005	004	013	016	035	049	041	041	034	026	024	014	014	022	018	024	026	18
8	024	019	021	021	020	018	019	021	039	023	023	025	024	020	016	010	003	008	009	010	010	010	009	008	17
9	008	008	009	013	019	024	026	023	019	018	016	013	013	011	009	006	006	006	006	005	006	005	005	005	11
10	005	005	005	005	005	006	006	006	007	008	015	019	017	014	009	014	013	009	008	011	009	011	009	013	9
11	012	009	008	007	006	011	014	026	030	054	086	083	060	070	061	048	056	059	063	075	071	046	031	026	41
12	029	018	019	016	009	008	008	009	010	008	008	008	008	006	006	006	030	042	619	009	008	008	007	007	12
13	006	005	006	006	005	005	005	004	004	004	005	005	005	004	003	003	003	003	003	002	003	005	005	006	4
14	007	008	007	004	005	006	008	009	009	009	---	008	007	007	006	005	004	005	003	003	005	005	004	004	6
15	004	004	004	003	003	003	001	001	002	002	---	003	003	004	003	003	004	004	003	003	003	003	003	003	3
16	003	003	002	002	002	002	001	001	002	004	005	003	004	004	005	004	004	004	003	003	005	005	004	004	3
17	004	003	005	008	005	004	011	023	016	016	007	003	002	015	004	003	003	002	003	002	003	004	004	008	2
18	014	009	008	006	019	020	015	019	025	029	038	065	063	083	085	070	064	035	034	014	025	024	017	013	33
19	012	013	016	049	028	020	019	025	034	060	088	063	080	060	046	043	023	014	018	018	042	024	049	043	27
20	071	048	014	008	008	008	008	016	026	025	017	018	018	020	023	025	029	030	030	069	086	078	039	029	30
21	040	038	030	018	016	016	015	011	008	006	006	006	006	006	006	006	005	005	006	006	005	005	005	005	11
22	005	004	004	004	004	004	004	005	009	021	009	---	003	003	002	005	010	039	033	004	011	031	031	014	9
23	026	016	009	009	006	010	007	011	008	013	043	045	028	040	025	035	039	044	028	013	030	016	006	028	22
24	030	028	014	015	007	005	005	003	004	011	011	008	009	024	012	005	001	001	003	008	003	004	006	013	9
25	009	006	013	001	000	000	000	000	000	000	000	001	001	001	003	000	000	001	000	000	000	000	000	000	1
26	008	006	014	010	023	029	021	019	021	031	016	011	017	018	013	010	011	006	003	004	004	003	001	000	12
27	000	000	000	000	000	000	000	001	006	011	014	014	010	008	008	006	007	009	009	021	015	010	005	003	6
28	003	003	003	003	003	004	003	003	003	006	015	---	009	004	003	003	003	003	001	001	001	001	001	001	3
29	001	001	001	001	000	001	001	003	004	006	003	003	002	003	002	003	004	003	001	001	001	001	001	001	2
30	010	013	006	006	009	006	009	011	014	020	018	---	006	016	020	019	008	020	029	011	009	006	011	011	12
31	006	006	004	003	005	008	020	019	030	035	028	018	028	031	026	024	020	017	029	030	029	029	038	026	21
MEAN	12	10	8	8	7	8	9	11	13	17	20	19	19	20	17	15	15	15	14	13	15	13	12	11	13

PERCENTAGE OF DATA VALID -99.06 PERCENTAGE OF DATA INVALID - 0.00 PERCENTAGE OF DATA UNAVAILABLE - .94

TABLE 5-1-9

SO_2 Data For Chedoke Site (West Mountain) - May 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION MACASSA LOCATION SHERMAN AND FENNEL DATE: 1979 MAY

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	006	005	005	004	005	005	006	006	006	008	008	009	009	008	007	008	007	008	008	007	007	005	006	004	6
2	003	003	002	001	000	000	001	011	008	006	016	014	007	006	025	013	009	009	005	004	005	004	003	009	6
3	016	006	011	018	021	015	014	011	008	008	009	008	---	008	009	007	008	008	006	007	007	006	006	006	9
4	006	005	004	004	003	003	002	003	001	001	003	001	001	002	004	003	003	003	003	002	001	003	001	001	2
5	001	001	000	000	000	000	000	000	000	000	000	003	004	003	003	004	003	003	003	002	001	001	00_	001	1
6	000	000	000	000	000	000	000	001	000	000	001	003	003	003	004	004	004	003	005	006	005	008	010	006	2
7	005	003	004	004	005	005	004	006	004	009	---	---	029	015	011	011	011	018	041	044	019	016	014	014	13
8	009	018	015	014	022	014	014	026	024	011	014	014	014	016	016	016	013	013	014	014	016	011	010	009	14
9	011	010	008	007	007	009	009	007	006	006	006	---	---	006	008	009	010	010	011	010	009	009	070	006	11
10	006	006	006	006	004	003	003	001	000	001	003	004	007	009	010	011	011	010	011	011	010	007	006	006	6
11	004	002	001	001	001	001	002	014	022	031	056	045	034	039	035	021	021	029	030	039	054	044	028	021	23
12	021	019	017	019	016	016	013	010	009	009	009	010	011	013	013	014	020	016	011	009	009	007	006	004	12
13	003	003	003	002	001	001	004	004	003	003	003	004	006	006	005	004	005	005	006	006	005	004	005	005	4
14	005	005	004	004	004	004	004	005	005	006	008	---	009	013	012	011	011	012	011	011	010	008	008	006	7
15	005	005	006	006	005	005	005	004	003	003	003	003	004	004	005	006	005	004	004	005	004	003	002	001	4
16	001	002	003	003	003	002	003	003	004	004	004	---	004	004	005	005	005	005	005	006	006	004	003	003	4
17	009	006	006	007	010	006	004	004	003	003	005	006	008	010	011	012	010	009	008	006	005	003	004	004	6
18	005	005	008	008	009	014	024	033	029	018	023	020	034	030	---	---	018	017	018	015	013	026	036	035	19
19	015	016	016	030	049	042	041	035	046	047	026	031	026	017	016	014	014	013	011	016	019	028	048	056	27
20	035	030	011	010	010	010	011	013	016	019	016	018	019	019	022	025	026	028	027	034	048	065	059	039	25
21	031	025	023	019	019	018	018	015	012	014	013	011	010	010	010	009	008	008	008	008	007	006	006	006	13
22	005	005	005	006	006	005	005	015	016	007	006	---	003	006	008	008	009	009	011	024	025	018	008	007	9
23	016	015	014	015	009	014	018	009	013	014	015	018	021	026	024	019	011	010	016	022	015	019	013	018	16
24	015	013	012	011	019	031	040	026	031	017	013	018	---	005	006	005	005	004	004	011	012	013	011	008	14
25	017	035	023	018	020	024	027	022	016	009	008	009	013	010	010	---	***	***	003	006	007	008	008	008	14
26	005	006	006	006	007	009	005	004	003	003	004	009	009	006	008	010	011	009	007	008	009	008	007	005	6
27	004	004	004	003	003	003	003	003	005	009	012	013	013	014	014	013	014	016	015	015	018	018	014	011	10
28	009	008	009	008	007	007	006	006	006	007	012	016	014	***	***	003	005	005	004	004	003	003	003	003	6
29	002	001	001	000	000	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	0
30	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	0
31	009	007	008	006	006	006	006	007	014	013	015	014	016	017	013	013	013	013	012	012	013	025	017	016	11
MEAN	9	8	7	8	9	9	10	10	10	9	11	12	12	11	11	10	10	10	11	12	12	13	14	11	10

PERCENTAGE OF DATA VALID -93.28 PERCENTAGE OF DATA INVALID - 4.97 PERCENTAGE OF DATA UNAVAILABLE - 1.75

TABLE 5-1-10

SO_2 Data for Macassa Site (Central Mountain) - May 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SIR J.A.M AC. LOCATION CANON AND BAY DATE: 1979 MAY

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
2	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	028	038	041	041	036	036
3	035	026	028	031	033	030	030	030	030	028	029	029	028	028	***	***	***	***	***	***	***	***	***	***	29
4	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
5	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
6	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
7	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
8	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
9	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
10	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
11	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
12	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
13	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
14	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
15	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
16	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
17	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
18	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
19	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
20	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
21	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
22	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
23	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
24	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
25	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	---	003	001	000	000	001	001	000	001	001	0
26	002	001	001	000	001	001	003	005	004	006	006	006	013	019	030	030	029	015	011	010	010	009	006	006	9
27	005	004	003	003	003	003	003	003	004	009	012	016	016	016	015	015	014	060	055	028	021	016	014	013	14
28	011	010	010	010	009	008	008	009	009	011	---	---	013	012	011	003	008	009	007	006	006	005	006	007	8
29	008	007	006	006	006	004	005	008	011	010	008	009	008	008	006	009	005	003	004	003	002	002	001	001	5
30	003	001	000	001	002	001	005	004	003	012	014	014	016	---	---	---	***	***	***	***	***	***	***	***	5
31	***	***	***	***	***	***	***	***	***	***	***	***	---	049	051	061	075	062	050	046	035	019	019	016	43
MEAN	10	8	8	8	9	7	9	9	10	12	13	14	15	22	22	21	22	24	22	18	16	13	11	11	13

PERCENTAGE OF DATA VALID -19.76 PERCENTAGE OF DATA INVALID -79.44 PERCENTAGE OF DATA UNAVAILABLE - .81

TABLE 5-1-11

SO_2 Data For Sir John A. MacDonald Site (Downtown Lower City) - May 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION CHEDOKE LOCATION WEST MNT. RICE AND MOHAWK DATE: 1979 JUN

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	023	016	006	041	056	028	030	029	033	030	036	036	038	035	024	030	016	043	055	015	019	018	021	048	30
2	020	010	010	008	006	005	003	003	006	004	004	004	003	003	003	003	003	003	003	003	003	003	003	003	4
3	004	004	003	003	005	004	003	004	005	006	006	007	005	004	006	005	004	006	003	003	003	003	002	001	4
4	001	001	003	003	003	003	004	005	004	004	004	006	004	---	006	006	002	001	003	007	008	008	001	000	3
5	000	000	000	000	000	000	000	000	000	001	000	000	000	000	000	000	000	000	001	000	000	000	000	000	0
6	000	001	001	005	005	005	004	024	025	030	040	041	043	033	039	036	034	030	023	039	044	014	005	008	22
7	010	015	014	020	006	010	016	023	038	046	047	050	060	053	039	045	088	088	085	098	030	021	018	014	38
8	034	030	016	015	013	008	008	010	008	009	009	009	009	006	007	006	004	004	004	004	005	004	003	003	9
9	003	003	002	001	002	001	001	003	006	016	024	066	045	064	058	033	056	060	048	034	029	028	022	020	26
10	010	009	008	007	006	008	008	008	008	009	010	012	016	016	014	009	007	006	006	007	004	003	002	001	8
11	003	001	001	001	000	000	000	001	001	001	001	003	004	004	003	003	003	003	003	003	003	002	002	004	2
12	002	001	001	001	000	000	003	004	006	002	001	002	002	001	001	001	001	000	000	000	000	001	000	000	1
13	000	000	001	000	000	000	000	000	000	001	001	001	001	001	001	001	001	001	001	003	002	002	001	001	0
14	001	001	000	000	000	001	003	001	002	003	008	013	---	009	009	008	006	006	006	006	005	003	006	005	4
15	004	003	004	008	011	010	006	003	002	002	003	006	004	004	006	007	006	006	007	004	003	002	003	003	5
16	001	003	002	002	002	001	003	005	005	004	004	004	004	004	005	005	005	005	004	003	003	003	003	003	3
17	002	002	001	001	003	003	003	004	005	008	008	009	008	009	008	009	011	011	011	013	010	005	004	004	6
18	003	001	002	002	001	000	000	000	000	000	001	003	003	003	003	004	005	010	009	017	005	004	003	001	3
19	004	003	004	004	003	004	004	008	023	016	022	024	026	005	004	003	003	003	003	004	004	001	003	005	7
20	005	006	009	008	008	011	019	019	018	005	004	005	006	006	---	004	010	045	091	075	031	021	015	004	18
21	003	004	008	004	003	002	003	003	003	004	009	009	006	005	004	007	008	008	008	009	006	003	003	002	5
22	003	003	004	004	003	003	001	001	002	002	003	003	003	002	001	003	003	003	003	003	002	001	001	001	2
23	001	001	001	001	001	000	000	000	000	000	001	001	001	001	001	001	001	001	001	001	001	001	001	000	0
24	000	002	001	000	000	000	000	002	001	002	000	001	000	000	001	003	004	003	003	003	003	003	003	003	1
25	002	003	002	003	002	002	003	005	009	033	038	034	018	009	013	007	006	006	003	003	002	001	000	001	8
26	001	002	002	002	001	002	003	003	004	013	009	013	004	003	004	---	006	009	013	010	009	008	006	006	5
27	004	005	009	011	011	013	018	018	013	009	013	009	008	008	009	008	005	003	004	004	003	003	003	003	8
28	003	003	003	003	002	002	002	003	006	020	020	013	025	025	009	009	023	015	014	016	009	006	005	005	10
29	004	003	003	003	002	004	007	008	008	029	035	033	033	058	068	055	037	046	035	029	024	018	011	023	24
30	021	013	021	016	026	030	024	033	041	031	060	063	039	060	048	060	035	014	009	016	023	013	009	006	29
MEAN	5	4	4	5	6	5	5	7	9	11	13	15	14	14	13	12	13	14	15	14	9	7	5	5	9

PERCENTAGE OF DATA VALID -99.44 PERCENTAGE OF DATA INVALID - 0.00 PERCENTAGE OF DATA UNAVAILABLE - .56

TABLE 5-1-12

SO_2 Data For Chedoke Site (West Mountain) - June 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION MACASSA LOCATION SHERMAN AND FENNEL DATE: 1979 JUN

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	013	014	014	013	017	016	015	011	014	022	023	---	---	021	043	033	030	023	019	050	040	017	021	022	22
2	014	004	004	003	001	001	001	001	***	001	***	***	***	001	001	001	001	002	003	001	000	***	***	001	2
3	000	000	***	***	***	***	***	***	***	001	002	003	005	004	005	004	004	005	005	004	004	004	003	001	3
4	001	000	000	000	000	000	***	***	001	001	004	004	005	005	---	013	006	006	006	008	008	008	006	004	4
5	003	003	003	003	002	002	002	001	001	001	000	***	***	000	004	003	003	003	003	001	001	003	004	004	2
6	010	009	009	004	002	003	***	000	001	003	003	002	002	003	006	006	008	006	010	006	008	009	011	008	5
7	006	003	003	001	001	000	009	009	005	014	028	014	013	---	010	010	009	021	055	090	078	024	010	008	18
8	020	014	012	009	007	006	003	009	008	006	006	007	008	008	008	008	008	008	008	009	009	007	***	***	8
9	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
10	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
11	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	006	008	008	007	006	005	005	004	004	003	5
12	002	003	003	003	001	003	001	001	001	002	003	003	003	003	004	003	003	003	003	003	002	001	001	001	2
13	000	001	000	000	000	000	001	002	001	002	002	003	003	004	004	005	005	005	005	004	004	003	002	002	2
14	003	003	003	003	001	001	000	001	015	043	016	023	038	048	020	015	015	016	017	016	016	015	014	012	14
15	011	010	011	012	013	013	013	011	011	013	017	---	---	016	019	023	024	023	021	020	019	019	016	015	15
16	014	014	013	013	012	011	012	013	014	014	015	013	019	021	024	026	026	028	026	024	021	019	016	014	17
17	013	011	011	011	012	011	011	013	012	014	016	019	020	021	023	022	023	025	024	026	029	021	017	015	17
18	013	011	010	008	008	006	006	005	004	005	004	006	011	018	018	015	011	009	008	008	007	005	003	004	8
19	003	001	001	001	003	004	014	014	008	011	008	007	005	004	004	004	004	005	005	004	004	003	003	5
20	003	004	006	011	027	019	018	016	007	008	008	010	011	011	012	---	---	011	024	035	013	009	011	009	12
21	009	010	010	009	009	008	008	010	008	008	009	013	012	013	013	013	016	018	018	016	015	013	011	010	11
22	010	009	010	009	009	008	008	006	007	006	005	006	006	006	006	---	004	004	003	003	002	001	001	000	5
23	001	002	001	002	002	002	001	001	001	001	000	000	000	000	000	000	***	***	***	***	***	***	***	***	0
24	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
25	***	***	***	***	***	***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
MEAN	7	6	6	6	6	6	7	6	6	8	8	8	10	10	11	10	10	11	13	16	14	9	8	7	8

PERCENTAGE OF DATA VALID -62.92 PERCENTAGE OF DATA INVALID -16.67 PERCENTAGE OF DATA UNAVAILABLE -20.42

TABLE 5-1-13

SO_2 Data For Macassa Site (Central Mountain) - June 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SIR J.A.M AC. LOCATION CANON AND BAY DATE: 1979 JUN

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	013	013	013	035	078	026	015	014	014	013	048	083	098	099	065	058	043	083	120	055	021	014	011	010	43
2	009	011	010	006	005	006	005	004	004	003	003	003	003	003	003	004	004	005	005	005	004	003	003	005	4
3	005	005	005	005	003	003	003	003	004	005	006	007	006	007	009	008	008	009	008	008	008	007	006	006	6
4	005	005	005	006	006	006	006	005	006	006	006	007	---	011	016	018	016	014	014	018	020	021	018	014	10
5	013	013	013	011	011	011	009	009	009	008	008	008	008	009	009	009	009	009	009	010	009	008	007	006	9
6	006	006	006	006	008	006	005	005	005	006	007	012	025	039	023	021	022	026	015	014	019	010	008	009	12
7	010	012	011	009	008	008	009	008	018	021	019	---	036	042	023	038	043	037	072	059	021	019	013	011	23
8	010	009	010	009	008	006	008	006	006	006	006	006	007	007	006	007	008	008	008	008	008	008	008	006	7
9	007	006	006	006	006	006	006	005	006	006	006	005	005	008	009	013	017	029	036	026	033	018	016	019	015	13
10	011	009	008	009	007	006	005	005	005	005	005	004	005	005	005	006	006	006	006	006	006	006	005	005	6
11	004	004	004	003	003	003	003	003	003	003	---	---	003	004	004	009	006	011	011	008	004	004	004	003	4
12	003	003	003	003	003	003	002	001	003	003	004	007	005	003	003	003	003	003	004	003	003	003	004	004	3
13	005	005	004	004	004	005	005	005	006	005	006	005	006	006	006	006	005	006	006	006	005	005	005	005	5
14	005	005	005	005	004	003	004	004	005	005	---	011	011	021	018	016	016	016	017	017	016	017	019	019	11
15	016	014	014	017	018	018	016	013	013	013	014	019	018	018	018	019	021	021	021	020	021	020	019	019	17
16	019	018	017	016	016	016	017	018	019	018	018	016	016	016	016	017	017	018	018	018	017	016	016	017	17
17	014	014	013	013	013	015	015	015	016	018	018	019	019	018	018	018	019	021	020	023	024	016	014	014	16
18	013	012	010	011	012	011	009	008	008	007	008	015	008	007	006	008	014	012	011	013	008	008	009	004	9
19	003	003	003	002	001	002	003	004	004	003	003	004	015	023	011	009	009	013	024	031	026	007	006	005	8
20	003	003	002	001	004	005	003	004	011	019	044	058	075	---	---	086	088	062	095	098	065	033	021	016	36
21	016	014	014	011	008	008	008	007	006	005	004	006	006	005	007	007	008	008	008	008	009	008	007	006	8
22	007	006	006	006	006	006	005	005	005	005	005	006	005	005	004	---	004	005	004	004	004	003	003	003	4
23	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	004	004	004	004	003	003	003	003	3
24	003	004	004	004	003	003	003	003	004	004	005	005	005	005	006	009	009	009	009	008	009	010	009	007	5
25	008	008	008	008	009	008	008	008	011	014	016	063	025	016	028	028	030	021	014	014	013	013	012	011	16
26	013	012	011	011	010	009	010	012	014	020	041	054	054	064	054	043	026	027	031	032	031	029	025	026	27
27	024	024	026	028	029	030	032	031	030	---	---	014	015	016	013	011	009	010	010	012	011	010	009	009	18
28	009	009	010	010	009	010	008	006	005	006	011	010	014	024	024	016	014	028	041	034	019	014	013	009	14
29	008	008	011	011	011	011	011	014	021	025	016	012	011	018	024	036	021	019	018	016	014	011	009	007	15
30	009	010	010	009	008	008	007	008	009	010	016	026	018	014	020	020	020	013	010	008	008	009	010	009	12
MEAN	9	8	8	9	10	8	8	7	9	9	12	17	18	17	15	18	17	18	21	19	14	11	10	9	12

PERCENTAGE OF DATA VALID -98.61 PERCENTAGE OF DATA INVALID - 0.00 PERCENTAGE OF DATA UNAVAILABLE - 1.39

TABLE 5-1-14

SO_2 Data for Sir John A. MacDonald Site (Downtown Lower City) - June 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION CHEDOKE LOCATION WEST MNT. RICE AND MOHAWK DATE: 1979 JUL

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	005	004	004	003	003	003	002	002	002	002	002	003	003	003	003	003	003	004	004	003	003	002	002	001	2
2	001	001	002	001	001	001	001	001	001	001	002	003	004	003	003	---	004	003	003	003	003	002	001	001	2
3	001	001	001	000	000	000	000	001	002	003	003	003	004	003	003	003	004	003	003	003	002	002	004	004	2
4	006	004	003	002	001	004	010	009	005	025	025	021	004	003	001	000	001	002	003	003	001	000	000	003	5
5	002	000	000	001	000	000	000	000	***	***	***	000	002	000	000	***	***	000	***	***	***	***	***	***	0
6	***	***	***	***	***	***	***	***	***	***	***	***	013	008	009	009	008	007	005	004	014	021	016	009	004	9
7	004	004	003	003	003	003	003	004	004	005	013	009	008	008	013	009	009	009	009	009	007	006	005	005	005	6
8	004	004	002	001	001	002	003	004	007	007	006	006	006	006	006	007	006	006	006	006	007	007	007	007	011	5
9	012	009	008	006	004	006	010	013	019	019	029	070	045	039	030	030	038	021	023	026	021	014	016	013	011	20
10	006	005	004	003	003	003	004	006	009	008	009	006	006	005	003	003	003	003	003	001	000	000	000	000	000	3
11	000	001	005	003	003	002	003	003	004	002	003	004	005	003	003	004	003	002	003	003	003	003	001	001	2
12	000	000	000	000	000	001	001	001	001	001	002	003	003	004	001	001	001	001	004	003	003	003	003	002	1
13	001	000	000	000	000	000	001	006	013	023	058	111	088	059	052	046	024	016	018	019	018	014	009	011	24
14	011	006	008	016	011	014	013	011	011	014	009	010	008	006	005	005	006	008	007	006	005	004	004	006	8
15	007	006	006	004	004	003	003	013	010	008	007	005	004	004	004	003	003	003	003	003	003	002	001	001	4
16	002	002	001	000	000	000	000	002	008	005	008	003	004	---	007	008	013	055	008	006	007	005	005	004	6
17	004	003	004	004	004	004	004	005	008	009	013	019	024	030	021	031	034	019	010	009	009	003	001	000	11
18	000	000	000	000	001	000	001	003	002	001	003	003	004	006	014	018	018	018	016	011	004	003	003	003	5
19	003	004	004	004	006	008	007	006	009	005	004	---	004	004	004	003	003	004	005	006	004	004	004	004	4
20	004	004	003	008	005	004	006	008	011	021	017	009	008	008	007	008	007	007	009	010	009	019	018	009	9
21	008	007	006	006	005	004	003	004	006	011	009	010	008	008	010	011	011	028	025	011	010	010	009	008	9
22	006	007	008	008	008	005	004	010	020	018	014	010	008	008	009	009	009	009	011	016	018	018	018	016	11
23	013	010	009	011	011	008	009	010	014	017	012	011	045	045	024	019	016	019	021	048	033	019	009	007	18
24	006	006	004	004	004	006	006	014	013	---	003	003	006	008	007	007	003	002	001	003	004	002	001	003	5
25	002	000	000	004	004	004	006	004	003	010	010	009	010	008	007	006	008	007	005	003	003	004	005	005	5
26	005	006	005	007	006	005	004	005	004	004	006	006	006	007	009	008	006	008	009	007	006	006	005	005	6
27	004	004	003	004	004	004	004	005	005	006	---	019	019	016	009	006	007	006	006	006	006	012	008	007	7
28	004	004	006	005	005	006	006	005	009	008	010	009	***	***	***	***	***	005	004	004	004	004	004	003	5
29	003	003	003	001	001	001	000	001	003	010	033	036	009	005	004	004	011	014	008	008	008	005	004	004	7
30	003	004	006	008	009	008	016	014	011	011	009	005	004	006	005	004	005	005	004	001	007	010	001	004	6
31	004	004	005	007	007	006	006	006	004	006	007	006	006	007	006	005	004	002	001	001	001	001	001	002	4
MEAN	4	3	3	4	3	3	4	5	7	9	11	13	12	11	9	9	8	9	7	8	7	6	5	4	6

PERCENTAGE OF DATA VALID -95.70 PERCENTAGE OF DATA INVALID - 3.63 PERCENTAGE OF DATA UNAVAILABLE - .67

TABLE 5-1-15

SO_2 Data For Chedoke Site (West Mountain) - July 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION WESTMOUNT LOCATION MONTCALM AND ELD. DATE: 1979 JUL

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
27	---	---	---	---	---	---	---	---	---	---	---	---	---	016	014	008	008	008	008	008	007	006	010	008	009	9
28	005	005	006	009	008	006	006	006	008	012	013	011	009	008	011	009	009	009	010	009	009	008	008	008	8
29	007	006	006	007	006	007	006	007	011	018	038	035	034	013	011	011	017	014	013	011	014	013	011	009	13
30	009	009	009	008	010	010	011	013	011	013	012	010	011	013	013	013	013	016	015	014	018	021	015	015	12
31	013	013	014	015	016	016	016	014	013	---	011	011	009	009	008	009	008	009	010	010	009	008	007	006	11
MEAN	8	8	8	9	10	9	9	10	10	14	18	16	15	11	10	10	11	11	11	10	11	12	9	9	10

PERCENTAGE OF DATA VALID -14.38 PERCENTAGE OF DATA INVALID - 0.00 PERCENTAGE OF DATA UNAVAILABLE -85.62

TABLE 5-1-16

SO_2 Data For Westmount Site (West Mountain) - July 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SHERWOOD LOCATION HIGH AND EDGEWOOD DATE: 1979 JUL

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
14	010	009	013	008	008	004	001	001	003	005	005	008	016	019	010	014	013	010	008	010	009	009	008	008	10
15	011	015	014	014	011	010	011	015	016	016	015	013	011	011	013	016	036	029	014	011	013	011	010	010	10
16	006	008	009	009	006	004	001	003	002	003	010	008	***	***	***	***	***	012	011	010	010	009	008	006	12
17	***	***	***	***	***	***	***	***	***	***	***	---	009	011	013	014	014	015	015	016	015	014	017	026	14
18	026	031	021	028	029	025	020	018	015	020	029	020	015	010	015	019	016	013	019	014	014	009	006	---	18
19	008	013	015	016	015	006	003	003	006	006	003	003	004	005	---	009	010	011	010	010	010	009	009	008	8
20	006	010	009	009	008	009	010	011	---	---	024	038	064	068	063	055	046	040	034	024	019	015	011	006	26
21	003	004	004	003	003	003	002	001	001	001	001	001	001	002	003	005	004	004	004	004	003	003	003	002	2
22	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	003	001	001	000	000	000	000	000	000	0
23	001	001	001	001	000	000	000	000	000	000	003	004	006	007	007	006	005	005	005	004	003	002	001	---	2
24	001	003	003	003	002	002	001	002	001	003	004	---	008	020	039	054	056	053	048	039	030	023	015	009	18
25	009	019	016	014	011	011	008	005	004	005	004	003	009	005	008	007	005	004	003	003	002	001	000	000	6
26	000	008	008	008	008	006	006	005	006	008	005	005	010	010	010	010	010	009	009	008	008	008	009	009	7
27	015	015	015	015	015	015	014	014	014	015	015	---	***	***	***	***	***	***	***	***	***	***	***	***	14
28	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
29	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
30	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
31	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
MEAN	7	10	9	9	8	7	5	5	6	7	9	9	12	13	16	17	17	16	13	11	10	8	7	6	9

PERCENTAGE OF DATA VALID -41.13 PERCENTAGE OF DATA INVALID -17.61 PERCENTAGE OF DATA UNAVAILABLE -41.26

TABLE 5-1-17

SO_2 Data For Sherwood Site (East Mountain) July 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SIR J.A.M AC. LOCATION CANON AND BAY DATE: 1979 JUL

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	010	011	010	009	008	008	008	008	008	006	006	006	005	006	006	006	006	006	006	006	005	004	003	003	6
2	002	001	001	001	001	001	001	002	003	002	001	001	002	003	003	003	003	003	003	003	003	003	003	003	2
3	003	003	003	003	003	003	003	003	003	003	004	004	005	004	004	006	005	005	004	003	003	005	006	013	4
4	012	006	004	003	004	003	003	008	007	019	026	013	008	006	---	***	***	***	***	***	***	***	***	***	8
5	***	***	***	***	***	***	***	***	***	***	---	006	006	006	007	008	008	007	008	008	008	006	003	003	6
6	003	003	003	003	003	003	003	003	004	005	---	006	008	008	010	011	009	007	007	011	013	013	009	006	6
7	005	004	003	003	003	002	003	003	004	006	006	006	008	009	010	009	010	009	011	010	008	006	006	005	6
8	004	004	005	005	005	005	005	005	008	009	009	010	009	010	010	010	011	011	011	013	011	010	008	008	8
9	007	006	007	006	007	006	006	005	008	009	018	040	029	040	036	029	021	020	021	021	018	015	014	011	16
10	012	011	011	010	010	009	008	008	007	007	---	---	005	006	008	008	009	008	006	006	007	008	006	006	8
11	006	006	008	008	008	008	006	005	004	005	005	006	006	009	009	008	008	008	010	010	009	006	004	004	6
12	004	005	005	004	004	004	003	003	003	004	005	005	005	005	006	007	008	009	009	009	008	009	009	008	5
13	008	007	007	005	005	004	003	003	003	---	---	008	009	013	016	026	045	044	030	026	024	023	016	013	15
14	011	010	010	011	012	012	011	011	010	009	006	009	013	013	014	014	013	013	013	013	011	011	011	012	11
15	013	013	013	013	013	013	013	013	013	013	010	010	010	010	011	011	010	010	010	010	009	008	006	005	10
16	005	005	004	003	003	003	002	002	003	003	---	---	004	005	006	008	007	013	025	013	008	006	006	006	6
17	006	007	006	004	003	003	003	003	003	004	004	003	007	028	024	009	016	007	006	006	007	005	004	003	7
18	002	002	002	001	001	001	001	001	003	003	004	004	005	004	011	011	023	026	023	019	013	006	003	001	7
19	001	001	001	001	000	000	000	002	004	003	002	001	001	001	002	002	002	003	004	005	005	004	004	003	2
20	003	003	004	003	004	005	006	006	009	014	013	007	006	006	009	---	011	010	009	007	007	011	020	013	8
21	009	006	005	005	006	004	003	003	003	004	005	006	007	008	009	014	018	015	021	012	011	010	010	008	8
22	008	008	009	009	009	008	008	010	018	019	016	012	009	008	009	010	009	009	010	011	014	017	016	016	11
23	015	013	013	012	013	013	008	006	006	006	***	***	***	***	***	***	***	***	***	***	***	***	***	***	10
24	***	***	***	***	***	***	***	***	***	***	***	***	***	***	---	003	004	005	005	004	004	005	005	004	4
25	003	003	003	003	002	001	001	001	000	000	000	000	000	000	003	003	003	003	004	003	003	002	001	001	1
26	001	001	001	001	001	001	001	001	001	001	000	000	000	000	000	003	003	003	003	003	003	003	003	003	1
27	003	002	002	002	002	001	001	001	001	001	002	006	012	---	008	008	008	011	015	016	014	009	007	005	5
28	004	004	004	003	003	003	003	001	001	001	001	003	004	004	007	008	008	008	008	008	007	006	006	005	4
29	005	004	004	004	004	004	004	003	004	005	012	020	014	017	022	024	036	029	025	020	020	014	011	010	13
30	009	008	008	008	007	007	007	007	009	011	013	012	013	016	021	---	***	***	***	***	***	***	***	***	10
31	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
MEAN	6	5	5	5	5	4	4	4	5	6	7	7	7	9	10	9	11	11	11	10	9	8	7	6	7

PERCENTAGE OF DATA VALID -87.77 PERCENTAGE OF DATA INVALID -10.48 PERCENTAGE OF DATA UNAVAILABLE - 1.75

TABLE 5-1-18

SO_2 Data For Sir John A. MacDonald Site (Downtown Lower City) - July 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SIR W. CH URCHILL LOCATION MAIN AND ADELINE DATE: 1979 JUL

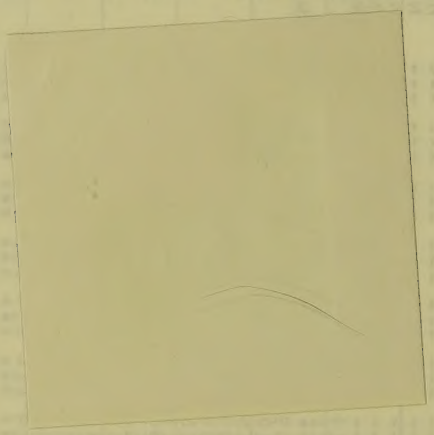
POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
13	---	---	---	---	---	---	---	---	---	---	---	---	---	018	023	016	018	019	019	018	018	016	015	014	013	17
14	009	006	006	006	008	005	003	001	000	000	003	003	008	005	005	010	020	011	004	003	000	***	***	***	5
15	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
16	***	***	***	***	***	***	***	***	***	***	***	***	003	004	005	006	008	009	009	009	009	008	008	008	7
17	006	006	005	005	009	006	006	006	---	---	---	004	005	008	008	308	009	010	010	009	006	006	009	013	21
18	010	014	011	009	008	009	006	008	015	015	011	009	011	016	009	009	013	015	015	014	006	006	009	023	11
19	020	006	005	005	005	005	004	006	005	004	003	003	003	004	004	---	006	009	029	020	011	010	009	004	7
20	005	005	004	005	006	008	005	004	003	023	016	006	005	008	---	006	008	009	009	009	009	008	009	005	7
21	005	004	003	002	001	005	003	000	003	019	030	014	009	008	009	013	010	016	029	025	013	011	010	010	10
22	009	006	010	011	008	006	006	008	015	023	016	013	010	009	010	010	011	015	018	020	021	020	019	019	13
23	020	018	019	018	011	013	013	009	005	009	014	014	015	015	014	015	020	025	024	029	030	024	016	013	17
24	011	009	008	006	005	008	008	006	006	008	008	006	---	010	011	013	013	010	009	009	010	010	009	009	8
25	008	006	005	006	013	010	013	009	006	010	015	013	015	011	020	025	025	015	014	010	009	008	006	008	11
26	006	006	006	008	007	008	006	005	005	004	003	004	009	008	009	009	009	010	010	009	009	010	008	009	7
27	009	006	006	006	006	009	008	006	007	009	016	019	---	004	004	006	007	009	010	009	008	008	007	006	8
28	009	013	006	005	004	005	004	002	002	003	005	006	005	004	006	005	005	006	006	006	006	006	005	004	5
29	003	001	001	001	001	004	003	002	014	016	013	008	009	009	008	009	008	009	009	009	011	019	009	006	7
30	007	004	003	002	001	005	004	002	003	006	012	016	009	011	011	014	010	019	014	014	025	024	015	014	10
31	015	015	014	018	019	018	017	015	013	015	015	016	---	***	***	***	***	***	***	***	***	***	***	***	15
MEAN	9	7	7	7	7	7	6	5	6	10	12	9	8	9	9	29	11	12	13	13	11	12	10	10	9

PERCENTAGE OF DATA VALID -51.88 PERCENTAGE OF DATA INVALID - 6.72 PERCENTAGE OF DATA UNAVAILABLE -41.40

TABLE 5-1-19

SO_2 Data For Sir Winston Churchill Site (East Lower City) - July 1979



MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION WESTMOUNT LOCATION MONTCALM AND ELD. DATE: 1979 AUG

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	005	005	005	004	005	004	004	004	005	004	005	006	008	009	013	010	008	003	003	002	001	001	001	001	4
2	001	001	001	001	002	001	001	001	001	002	002	001	002	001	001	001	001	002	003	002	001	001	001	001	1
3	001	001	001	001	001	001	001	001	001	003	003	---	005	004	003	003	---	***	***	***	***	***	***	***	2
4	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
5	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
6	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
7	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
8	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
9	***	***	***	***	***	***	***	***	***	***	***	001	001	001	002	003	004	005	005	004	002	001	003	004	2
10	003	002	002	001	003	002	002	001	000	001	003	003	004	005	005	006	010	011	011	010	009	007	003	003	4
11	008	006	009	008	006	006	006	006	005	005	005	006	008	014	013	019	020	013	011	014	014	006	008	010	9
12	010	010	010	010	013	011	010	010	024	018	010	009	008	009	008	009	010	011	014	011	010	008	006	006	10
13	005	005	005	005	005	005	005	005	005	007	---	004	005	007	013	021	013	010	010	010	009	010	010		7
14	010	010	011	011	010	010	009	008	006	006	006	006	006	006	006	005	005	008	007	006	005	004	005	007	7
15	008	007	006	005	005	005	005	006	006	006	009	009	008	007	007	006	008	010	009	007	008	007	007	008	7
16	009	006	008	008	007	006	006	006	005	---	030	019	010	009	008	009	013	015	011	010	008	006	006	008	9
17	006	005	005	005	005	005	006	007	006	---	006	008	008	009	011	013	019	023	019	013	011	010	009	009	9
18	009	007	008	010	010	010	011	011	009	010	010	010	009	010	011	010	010	010	008	006	005	004	005	004	8
19	005	005	005	005	005	005	004	004	004	004	005	006	010	011	015	013	021	020	016	010	008	009	008	006	8
20	005	005	004	005	004	001	002	004	005	023	026	008	006	005	006	007	010	009	008	006	005	005	006	011	7
21	011	011	010	010	008	005	004	009	025	031	030	015	013	006	005	006	008	010	010	010	010	005	005	007	11
22	008	006	008	005	005	005	011	031	041	044	029	030	020	018	019	021	026	026	025	024	033	038	058	055	24
23	039	019	009	006	008	009	009	008	008	---	009	009	010	011	013	013	018	034	018	014	011	009	009	010	13
24	009	009	016	015	013	011	010	011	011	012	014	015	015	014	013	014	014	015	016	015	014	014	014	015	13
25	015	014	011	011	010	010	010	010	010	011	012	013	010	011	011	013	013	015	015	015	015	014	019	016	12
26	011	010	010	009	009	008	006	010	013	019	028	023	021	020	020	023	031	039	025	013	011	012	011	011	16
27	013	013	013	013	026	021	015	015	016	038	028	016	014	013	009	010	015	016	016	014	011	010	011	011	15
28	010	010	010	009	009	008	013	013	008	010	013	020	023	020	014	019	028	026	018	013	011	013	011	010	14
29	010	010	010	009	009	005	005	005	005	005	005	005	005	005	005	005	005	005	005	005	005	005	005	005	5
30	005	005	005	005	005	005	005	005	005	005	005	008	008	009	009	010	013	013	012	010	010	010	010	013	7
31	010	010	010	010	010	010	010	010	010	018	018	015	018	018	015	015	013	013	009	008	005	005	005	005	11
MEAN	9	7	7	7	7	6	6	8	9	12	12	10	9	9	9	10	13	14	12	10	9	8	9	9	9

PERCENTAGE OF DATA VALID -80.65 PERCENTAGE OF DATA INVALID -18.55 PERCENTAGE OF DATA UNAVAILABLE - .81

TABLE 5-1-20

SO_2 Data For Westmount Site (West Mountain) - August 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SHERWOOD LOCATION HIGH AND EDGEWOOD DATE: 1979 AUG

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
2	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
3	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
4	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
5	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
6	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
7	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
8	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
9	***	***	***	***	***	***	***	***	***	***	***	***	001	005	006	006	005	004	004	004	004	003	004	004	4
10	004	004	004	004	004	003	003	003	004	004	---	***	***	***	***	***	***	***	***	***	***	***	***	***	3
11	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
12	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
13	***	***	***	***	***	***	***	***	***	***	***	***	***	***	---	007	009	011	009	009	009	010	009	010	010	9
14	010	011	010	010	011	010	011	009	008	005	006	006	006	006	006	007	007	006	007	007	008	007	006	005	005	7
15	006	005	005	006	006	006	006	006	006	005	005	005	005	005	005	005	005	006	005	005	005	006	005	004	5
16	008	007	005	004	005	004	004	007	028	029	010	009	011	013	014	012	010	012	011	012	009	008	008	008	10
17	008	009	004	005	006	006	006	007	006	007	---	008	009	010	013	016	020	033	029	019	020	018	014	012	12
18	012	012	013	013	013	013	014	015	014	016	016	013	011	012	013	013	013	013	011	013	008	007	008	008	12
19	008	007	009	009	008	009	010	009	010	022	022	011	010	014	025	028	023	019	015	013	015	013	011	008	13
20	006	009	006	011	013	014	011	012	020	020	009	---	013	013	014	017	018	016	015	014	011	010	013	016	13
21	021	024	021	019	018	018	019	023	040	---	020	024	021	017	014	013	015	014	013	011	009	011	014	014	17
22	012	016	014	013	013	013	015	020	023	016	013	020	007	006	009	012	018	020	021	029	026	025	019	014	16
23	013	009	008	009	009	009	008	009	009	011	---	015	018	022	026	045	058	043	030	026	024	023	020	019	20
24	020	019	025	035	024	019	018	017	018	019	020	021	023	021	019	021	020	024	024	024	026	026	024	024	22
25	023	021	018	017	016	015	013	013	013	013	012	012	011	008	***	***	***	***	008	011	013	014	015	014	14
26	011	008	006	007	007	008	009	012	016	018	013	008	007	008	009	009	009	009	010	009	006	006	009	008	9
27	006	010	013	010	012	010	010	008	009	016	018	012	005	004	006	006	008	007	006	006	010	021	035	088	14
28	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
29	***	***	***	***	***	***	***	***	***	***	***	013	013	010	010	010	013	018	015	015	013	013	013	013	13
30	010	013	009	009	009	006	006	006	005	005	005	009	010	010	011	009	010	008	009	006	005	004	000	000	7
31	***	***	***	***	***	***	***	025	015	015	013	013	013	013	013	013	013	010	006	006	006	006	006	010	11
MEAN	11	11	10	11	10	10	10	11	14	13	13	12	10	10	12	13	15	15	13	12	11	12	12	14	11

PERCENTAGE OF DATA VALID -55.65 PERCENTAGE OF DATA INVALID -43.55 PERCENTAGE OF DATA UNAVAILABLE - .81

TABLE 5-1-21

SO_2 Data for Sherwood Site (East Mountain) - August 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION DUNDURN LOCATION YORK AND DUNDURN DATE: 1979 AUG

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N/A
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	003	000	001	001	001	001	000	000	0
3	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	001	001	001	001	001	001	001	001	001	0
4	001	001	001	001	001	001	000	002	005	005	005	005	005	005	005	005	005	005	005	007	007	007	007	007	4
5	007	006	005	005	005	004	003	003	003	003	003	003	003	003	003	003	003	003	003	003	003	004	005	005	3
6	005	006	006	006	006	005	005	004	003	003	003	003	003	003	003	003	003	003	003	003	004	005	003	002	3
7	002	002	002	002	002	002	002	002	002	002	002	002	---	002	004	003	003	003	004	004	004	004	004	004	2
8	005	005	005	004	003	003	002	002	002	003	003	003	003	003	003	003	003	004	005	005	005	005	004	004	3
9	003	003	003	003	003	002	002	002	002	002	003	003	003	003	003	003	003	003	004	004	004	003	003	003	2
10	004	003	004	004	003	003	002	002	002	002	003	003	003	---	001	001	001	001	001	001	000	000	000	000	1
11	000	000	000	000	000	000	000	000	000	000	000	001	001	001	001	001	001	002	002	002	002	002	001	001	0
12	001	001	001	001	001	001	000	001	001	001	001	001	001	001	001	001	002	001	002	001	002	000	000	000	0
13	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	---	000	000	000	001	001	001	001	0
14	001	002	003	003	003	003	002	001	001	002	001	002	002	001	001	001	001	001	002	001	002	001	001	001	1
15	001	001	001	001	001	001	001	001	000	000	000	000	000	000	000	001	001	001	002	002	002	001	000	000	0
16	000	000	000	000	000	000	000	000	000	000	000	000	---	000	000	000	001	002	001	002	001	002	000	000	0
17	000	000	000	000	000	000	000	000	000	000	000	000	000	000	000	001	002	000	000	000	000	000	001	001	0
18	000	000	001	001	002	001	001	000	001	001	000	001	001	001	001	001	001	002	002	002	001	001	001	000	0
19	000	000	001	001	001	001	001	001	001	001	002	002	002	003	003	003	003	003	004	003	004	004	003	002	2
20	003	002	002	002	002	001	001	002	001	001	001	000	000	001	002	001	001	001	001	001	002	003	003	001	1
21	000	000	000	000	000	000	000	000	000	000	000	002	001	001	000	001	001	001	001	001	001	002	000	001	0
22	001	000	000	000	000	000	000	000	000	000	000	000	000	001	001	001	001	002	003	003	004	004	003	003	1
23	002	001	003	002	002	002	000	000	001	001	001	001	006	007	005	004	004	004	004	004	004	004	003	004	2
24	003	004	004	005	004	004	004	004	004	005	005	004	003	004	004	003	004	004	005	003	003	003	003	003	3
25	003	003	005	005	005	003	003	003	003	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	2
26	002	004	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	003	001	2
27	001	001	001	002	002	001	000	000	001	000	000	001	001	002	003	004	004	003	003	003	003	003	003	003	1
28	003	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	002	003	2
29	002	003	002	003	003	003	003	003	003	005	003	003	003	001	002	002	002	002	002	002	***	***	***	***	2
30	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
31	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
MEAN	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	1	1

PERCENTAGE OF DATA VALID -87.10 PERCENTAGE OF DATA INVALID - 7.12 PERCENTAGE OF DATA UNAVAILABLE - 5.78

TABLE 5-1-22

SO_2 Data For Dundurn Site (West Lower City) - August 1979

MCMASTER UNIVERSITY AIR POLLUTION LABORATORY

STATION SIR J.A.M AC. LOCATION CANON AND BAY DATE: 1979 AUG

POLLUTANT-SULPHUR DIOXIDE UNITS-PARTS PER BILLION

DAY	HOUR 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	MEAN
1	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
2	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
3	***	***	***	***	***	***	***	***	***	***	***	***	***	***	---	006	007	009	009	011	013	012	011	010	010	9
4	010	011	010	010	010	011	010	010	010	010	011	011	013	013	010	011	011	011	011	011	010	010	011	013	10
5	013	012	013	012	012	011	011	011	011	011	011	012	012	012	010	009	010	010	010	010	010	010	009	008	007	10
6	007	007	007	006	007	006	007	007	006	006	008	023	028	030	035	034	030	027	025	019	014	011	008	006	15
7	005	004	007	004	004	003	003	008	006	004	006	020	035	---	008	008	007	006	006	005	005	004	003	003	7
8	003	003	002	002	001	001	001	000	000	000	000	000	000	000	000	011	004	004	004	003	002	001	001	001	1
9	001	001	001	001	001	000	000	001	002	002	002	003	009	035	034	031	034	033	020	019	013	010	008	006	11
10	005	004	006	004	003	002	002	002	002	001	002	003	---	002	002	002	003	003	003	003	002	001	001	000	2
11	000	000	000	001	001	000	001	000	001	000	000	000	001	006	008	018	028	031	014	006	004	004	004	006	5
12	007	006	006	007	006	005	005	005	007	006	004	006	009	016	010	020	020	018	014	007	005	004	005	004	8
13	004	003	003	003	003	003	003	005	007	007	007	007	006	006	005	---	***	***	***	***	***	***	***	***	4
14	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
15	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	N/A
16	***	***	***	***	***	***	***	***	***	***	***	***	---	024	016	011	013	011	008	008	006	005	003	003	9
17	003	002	001	001	001	001	001	003	004	006	006	006	005	---	005	005	006	008	011	016	019	008	007	005	004	5
18	003	001	002	002	003	003	003	002	003	003	003	002	001	003	003	003	004	003	002	003	002	003	002	002	2
19	003	003	003	003	003	003	004	003	003	003	003	004	009	017	021	028	021	019	018	018	013	012	009	008	9
20	006	005	004	003	003	003	003	003	003	003	005	007	008	011	014	011	020	023	016	010	019	012	008	006	8
21	005	005	006	005	004	004	004	005	004	006	011	016	016	014	016	---	016	017	017	008	006	003	002	002	8
22	001	001	001	000	002	002	001	001	001	002	009	010	009	015	020	025	019	014	013	011	009	008	008	007	7
23	004	003	005	004	004	003	003	003	003	003	002	003	---	001	001	002	001	002	001	002	003	001	001	000	2
24	000	001	001	001	001	001	001	000	000	001	002	002	002	002	002	003	003	003	004	004	003	002	004	003	1
25	003	003	003	003	003	003	003	003	003	003	003	004	006	006	006	006	006	006	007	006	006	005	004	003	4
26	003	003	002	001	001	001	000	001	001	002	003	005	007	011	008	010	009	006	006	004	003	003	003	001	3
27	004	003	004	003	004	004	002	001	001	001	004	005	005	006	006	007	008	006	005	005	004	004	004	004	4
28	003	002	001	001	001	001	000	001	000	000	001	001	003	003	004	005	005	006	007	006	007	006	004	005	3
29	004	003	003	003	003	003	002	001	003	003	003	003	---	003	004	004	005	005	005	005	005	005	005	004	3
30	005	005	005	005	005	005	005	005	004	005	005	005	005	006	006	006	006	006	006	005	004	005	004	003	5
31	000	000	000	000	000	000	000	000	000	003	003	005	005	005	005	010	018	015	008	007	006	005	003	003	4
MEAN	4	3	3	3	3	3	3	3	3	3	4	6	9	10	9	11	12	11	9	8	6	5	4	4	5

PERCENTAGE OF DATA VALID -81.45 PERCENTAGE OF DATA INVALID -17.34 PERCENTAGE OF DATA UNAVAILABLE - 1.21

TABLE 5-1-23

SO_2 Data For Sir John A. MacDonald Site (Downtown Lower City) - August 1979

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3 2022 21336066 8